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FOOD PAPERS.

FOOD PAPERS:

A POPULAR TREATISE ON DIETETICS.

BY

SAMUEL PHILLIPS DAY.

> "Not to know at large of things remote
> From use, obscure and subtle, but to know
> That which before us lies in daily life,
> Is the prime wisdom." MILTON.

FIRST SERIES.

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CHAPTER I.

THE FOOD OF MAN.

THERE are few subjects, I take it, more important than that which appertains to the food of man; for upon this mainly depends the continuity, strength, stamina, vigour, and progress of the human race. It was the salutary sense of this truth which led a thoughtful writer on diet to speak thus: "Although as a surgeon I highly value anatomy and, as a philosopher, I have an intense interest in physiology, chemistry, and other branches of the profession, yet, as a dietician, I know them to be worse than useless; for the slighest error in induction upon the facts of those sciences, leads to errors fatal to strength, health, and life; and I have arrived at the conviction that a knowledge of the qualities of various articles of diet is more important than a knowledge of structure and function, because it alone involves the practice of the dietician."* Diet, therefore, might fitly be classed under the category of preventive medicine, the same as climatology.

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* On Diet: with its Influence on Man, &c. By Thomas Parry.

Ignorance of matters appertaining to everyday life is replete with mischief; and, as health and strength are only preserved and sustained by careful regimen, it behoves every one who has arrived at the age of reason assiduously to study the system of dietetics, and to apply his knowledge to practical purposes. "The proper study of mankind is man,"—and the nature of the aliment he requires.

It has been aptly remarked that "the management of our diet needs the aid of reason and philosophy," a postulant which few will be prepared to controvert. But, in what consists the food of man? Some have asserted that man has in reality no natural food, but was necessitated to discover for himself such products as he could most readily procure and advantageously assimilate. Even the eminent naturalist, Buffon, was of opinion that wheat, which is proverbially called the "staff of life," is purely a factitious offspring, like most other vegetables employed as food; and that it has reached its present state of perfection, after the long lapse of ages, owing to the art of agriculture. Exactly the like remark applies to articles of a similar species, including barley, rice, and rye, none of which appear to be indigenous, or rather to grow wild, in any part of the earth known to be inhabited by the race. "If," remarks Dr. W. B. Carpenter,* "we take a comprehensive survey of the conditions of the various races of man at present inhabiting the earth, we cannot help being struck with his adaptiveness to a variety of circumstances as regards climate, mode of life, diet, &c.; and we can scarcely avoid the conclusion, that the Creator, by conferring upon him such an adaptiveness, intended to qualify him for subsisting on those articles of diet, whether animal or vegetable, which are most readily attainable in different parts of the globe; and thus to remove the obstacle which a necessary restriction to any one kind of food would have otherwise opposed to his universal diffusion."

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* Principles of Human Physiology.

No doubt the "adaptiveness" spoken of, coupled with the natural propensity for variety of food, has induced the careful pursuit of agriculture, and has necessarily raised plants, from which our chief vegetable products have sprung, to a high degree of culture, so that, to all appearance, little or no relationship exists between the present and the original growths. There is the potato, for example. This often and undeservedly abused root owes its origin to a tiny, acrid bulb, discovered growing naturally in Monte Video, Chili, and other places. And yet a garden weed, as it were, bearing tubers too nauseous for utilisation, has, by the dint of cultivation, been transformed into an agreeable esculent, relished by the most fastidious palate, and of which one never tires, as is the case with yams and similar products. The potato at one period formed the staple article of diet with the Irish people, and they throve well upon it. It still is the chief alimental stay of the peasant population; while in England, and most European countries, it is absolutely indispensable as an adjunct of dinner. So important is the potato, that much anxiety is at present occasioned in consequence of the appearance of the blight which has been so destructive to that edible in past times, and owing to which, fell Famine largely depopulated the sister island. It cannot be gainsaid that amongst the farinaceous aliments the potato holds a distinguished place. Nevertheless its digestibility and necessary wholesomeness entirely depend upon the manner of its preparation. Few cooks know how to prepare this food properly. I confess a preference for potatoes "boiled in their jackets," as the phrase goes, and not over-done, with barely the skin cracked, or "laughing," thus exposing the farina of the vegetable, its most nutritious portion. It is for this reason that I object to paring potatoes before boiling, as the dietetic loss becomes considerable, owing to the action of the boiling water in which such vegetable is immersed.

Then of other esculents, scarcely less indispensable than the favourite potato, we have one division consisting of turnips, carrots, parsnips, artichokes, radishes, &c., together with those used as condiments, including onions, garlic, and horse-radish. Like to the potato plant, the cabbage, savoy, and cauliflower are the result of patient labour and skilful cultivation. They are directly derived from the *coleworth*, an insignificant plant having but scanty leaves. The same may be said of the delicious celery, which has been metamorphosed from a nauseous root, known by botanists as the *Apium* *graveolens.* The carrot was not introduced into England until the reign of Elizabeth, nor the turnip until the time of Charles I., when Lord Townshend, the King's secretary, caused it to be placed upon the Royal table. It is well known that during the best times of the old Roman Republic this esculent comprised the main support of a large portion of the populace. As respects the acrimonious onion, the French appear to fully recognize the nourishment it affords. Hence the soup *a l'oignon* is regarded by them as the best of all restoratives. Nor are the Scotch less mindful of the intrinsic virtues of this root. If the testimony of an eminent writer is of any weight, a Highlander fortified with a few raw onions in his pocket and some bread or oat-cake, can travel for two or three days consecutively without having occasion to partake of any other food.

If we turn to fruits, we shall find that, as regards many of them, similar progressive changes and improvements have occurred, just as in the case of such vegetables as we have been noticing. Especially might mention be made of the banana, peach, golden pippen, and plum ; the last three of which have by the magic wand of horticulture, been organically converted from the tough, coriacious covering of the almond, the sour aloe, and the austere crab, into their present excellent form, colour, and richness. Thus, apparently, has it been decreed, to use the language of Dr. Paris, that man "shall earn his bread by the sweat of his brow ; or in other words, that he shall, by his industry, discover substances from whence he is to procure subsistence; and that if he cannot find such, he must cultivate and alter them from their natural state." But under no circumstances whatever can it be alleged that Nature is a stingy step-mother. She is prodigal in her gifts; even more so than is commensurate with the combined natural and artificial wants of man. In the fulness of an unbounded munificence, for which the race is not always sufficiently grateful, Nature gives, gives, is always giving; while she generously aids every effort put forth to render the earth more fruitful.

What an extensive variety both of animal and vegetable substances is comprised in the comprehensive phrase—food of man? And albeit certain of the articles that supply the sharp need of appetite are absolutely foreign to the purposes of nutrition; nevertheless, owing to a wise provision of Nature, such become innocuous when combined with others wherein the power of nutrition specifically resides. As Béclard * declares, "In a well-arranged system of diet, the proportion that the *non-azotised* substances ought to bear to the *azotised* should be determined by the proportion of carbon and nitrogen which become eliminated from a healthy system in a given period." It is generally found that about 300 grains of nitrogen and 4,600 grains of carbon are daily discharged by the several channels of the lungs, skin, &c.; the proportion of the nitrogen to the carbon eliminated being nearly in the proportion of 1 to 15. Now, if we compare the chemical composition of bread and meat, it will be found in what their relative values as aliments consist, as well as the proportion which the carbon holds to the nitrogen. Payen * affirms that 1,000 grains of bread contain just 300 grains of carbon and 10 grains of nitrogen. In order to obtain 300 grains of the latter, as required by the human system, fully 30,000 grains (equal to four pounds) of bread need to be consumed. On the other hand, the requisite 4,600 grains of the former are contained in 15,000 grains of bread. It follows, therefore, that in order to obtain the essential supply of nitrogen, the quantity of bread eaten must contain exactly twice the amount of carbon requisite. For this reason it becomes most advantageous to add to a bread diet a certain proportion of cheese or other food in which the highly nitrogenous element is present.

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* Traitè Elementaire de Physiologie.

Then, reverting to the matter of meat, Dr. Payen shows how 1,000 grains of animal food contain 100 grain of carbon and 30 grains of nitrogen. It follows, necessarily, that with the object of obtaining the 4,600 grains of carbon, no less than 6½ lbs. need to be consumed to supply the sum total of carbon necessary to furnish the indispensable supply of nitrogen. From this fact is argued, most logically, I conceive, the advantage and superiority of a mixed diet, which is usual amongst the populations of all nations, no matter whether barbarous or civilised.

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* Des Substances Alimentaires.

One thing is certain, that a mixed diet of bread and meat is the more economical on the ground of the quantity consumed, necessitating less of each than if either were partaken of separately. It will be found that with the generality of persons 2 lbs. of bread and ¾ lb. of animal food are amply sufficient to compensate for the daily losses of the system of a vigorous man.

Not that I wish to disparage altogether an exclusively vegetable regimen, which many persons adopt apparently with advantage to themselves. What is termed a vegetable diet embraces a wide field, and, from its very variety, may peculiarly suit certain constitutions and persons engaged in non-laborious occupations. Indeed, Dr. W. B. Carpenter, an authority which I cannot refrain from acknowledging with respect, alleges that a well-selected vegetable diet is capable of producing in the multitude, even the highest *physical* development of which they are capable. Yet he is forced to concede that the substitution of a moderate portion of animal flesh, favours the highest *mental* development of a people. According to an eminent writer,* the food most natural to man is a mixed diet. Although thus far omnivorous, he yet readily adopts an exclusively animal or vegetable regimen in conformity with the circumstances in which he finds himself placed. "There are probably but few," observes our author, "of the carnivorous and herbivorous animals in whom careful experiments would not detect a similar, though scarcely equal, capacity for such a change of diet. Thus the herbivorous horse and cow may be brought to eat fish and flesh, and the carnivorous sea-birds can be gradually habituated to the far more difficult change implied in their feeding on grain."

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* Cyclopœdia of Physiology, vol. v.

There have not been wanting writers of considerable weight who have gone so far as to assert that until the Deluge animal food formed no portion of human diet, and that even then it was only resorted to from sheer necessity, owing to the dearth and deterioration of vegetables arising from this event. According to Cuvier, " Fruits, roots, and the succulent parts of vegetables appear to be the natural food of man ; his hands afford him a facility in gathering them ; and his short and comparatively weak jaws, his short canine teeth — not passing beyond the common line of the others—and the tuberculous teeth would not permit him either to feed on herbage or devour flesh, unless it were previously prepared by culinary processes." However, none can dispute that the race is carnivorous, even though it be, as Broussonet supposes, more herbivorous than otherwise. It is equally a fact that the race is omnivorous. Hence it comes that man is capable of subsisting upon every species and variety of aliment.

Divers races exist in a greater or less degree, though sometimes wholly, upon special natural products of the countries which they inhabit. Thus the natives of the South Sea Islands contrive to exist upon the bread-fruit tree (*Artocarpus incisa*), so beautifully referred to by Lord Byron*, the poet to whom, after fifty years' neglect, we are about to give a national monument:—

> "The bread-tree which, without the ploughshare, yields
> The unreap'd harvest of unfurrow'd fields,
> And bakes its unadulterated loaves
> Without a furnace in unpurchased groves;
> And flings off famine from its fertile breast—
> A priceless market for the gathering guest."

Further, the inhabitants of the torrid zone are bountifully supplied by Nature with the plaintain and the banana, which occupy the place that corn does to the denizens of European countries. It is said that in Mexico, where the banana is extensively cultivated, the like extent of soil placed under this crop is capable of maintaining fifty persons which elsewhere, under wheat, would not furnish food for two. Again, if we turn to India and China we discover that the masses of the population of those teeming empires largely subsist upon rice. According to Xenophon, the ancient Persians lived upon watercresses, which they valued as the most wholesome of vegetable productions.

Maize, chestnuts, and potatoes furnish the chief aliment of the Alpine peasant, but much meat, and a sparse supply of vegetables, comprise the regimen of the peoples of Northern Europe, such as the Danes, Swedes, Russians, Germans, and English. Some nations, on the contrary, resort almost exclusively to a fish diet, more from poverty, perhaps, than choice, however excellent in several respects such a diet really is. In one portion of the globe will be found people living as sparingly as the famous Spartans, while in other portions thereof the inhabitants eat enormously, just as in Siberia, where a man will devour twelve pounds of food daily without feeling encumbered thereby. I am not disposed to doubt Captain Lyon's assertion, namely, that an inhabitant of this chilly region will wash down his principal repast with a gallon or two of train oil. Nor are the Siberians apparently over nice in their tastes or appetites in other respects, judging from the incident that a fair damsel of that race affected a strong and irrepressible fancy for an eminent traveller's candles, swallowing them, without hesitation, wicks and all!

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* The Island, Canto ii. v. xi.

In primeval times, milk and vegetables constituted the only food of man; but as the world progressed, civilisation extended, and knowledge increased, human requirements grew apace, so that in process of time the world has become explored in order to administer to the necessities of the race. The gifts of Nature have invariably kept pace with human wants, although it happens that some of those, through what we may call the over-refinement of civilisation, have grown more abnormal than natural, and more pernicious than beneficial.

But however bountiful and even exuberant be Nature's gifts to man; however sedulously and ungrudgingly she studies his wants, there are times and seasons, circumstances and incidents, that operate in an opposite direction. Untimely blights, peculiar diseases, fierce convulsions of the earth, bad harvests, desperate wars, fell floods, and certain other calamities, suddenly fall upon this or that province, or even an entire country, not only threatening whole populations with ruin, but plunging them into despair. We have had painful knowledge of such untoward events for some time past. The first terrible failure of the rice crop in the East became the prelude of other miseries more or less widely spread. Not long since destructive inundations in France entailed frightful suffering upon tens of thousands of the peasantry. The like disaster fell upon Hungary. Volcanic eruptions brought incalculable suffering upon the inhabitants of Iceland; and, whilst we fancied ourselves secure, suddenly a week's incessant rain caused weeping and wailing not only in the West of England but in the Principality. Shocking accounts reached us daily of the sufferings of our own people, and of the quantity of cereals and hay, and the number of cattle destroyed. In many places the crops were absolutely ruined, while the potato plant was seriously injured, in some instances exhibiting unmistakable signs of virulent disease.

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CHAPTER II.

DEFICIENT DIET.

THE wear and tear upon the human system, no less than the constant waste arising from physical causes, render it imperative that the body should be regularly sustained by suitable and sufficient regimen. According to a high authority,* about 300 grains of nitrogen and 4,600 grains of carbon are daily discharged through the lungs, skin, &c., the proportion of the nitrogen to the carbon eliminated being as 1 to 15. Taking the two most important articles of diet, bread and meat,—to repeat what I have adduced in treating of the "Food of Man,"—it will be found that 1,000 grains of the former contain 300 grains of carbon and 10 of nitrogen, while 1,000 grains of the latter hold 100 grains of carbon and 30 of nitrogen. In order efficiently to sustain nature on either of these edibles, it would be requisite for an individual to consume, every twenty-four hours, more than 4 lbs. of bread, or else 6½ lbs. of animal food. Thus, it appears that to compensate for the periodical losses of the system in a healthy person, 2 lbs. of bread and ¾ lb. of meat are indispensable. Dr. Dalton conceives that 16 oz. of meat, 19 oz. of bread, 3½ oz. of fat, and 52 oz. of water: that is to say, 2½ lbs. of solid food and a little over three pints of fluid every twenty-four hours, are sufficient for maintaining health and strength; while Vierordt asserts that an adult is well nourished if he receives daily 4 oz. of dry albumen, 3 oz. of fat, 11½ oz. of some starchy substance, and about 1 oz. of salt, which gives a proportion of 1 part of nitrogenous to 3½ parts of non-nitrogenous food. Undoubtedly there are exceptions to every rule; hence, the absolute quantity of aliment required for the sustenance of the human body must depend upon the age, sex, constitution, and habits of the individual. Nor must climate be left out of consideration.

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* Dr. W. B. Carpenter, Principles of Human Physiology.

"One half the population of this teeming country know not how the other half live." This is by no means an exaggerated assertion, more especially in our large cities. The struggle for existence, always difficult, is becoming more and more severe. The original "curse" possesses more than its original significance: for the condition of things has changed, while the population of our globe has immeasurably augmented. Indeed, the marvel is how the earth we inhabit can be rendered sufficiently productive to satisfy the increasing demands of the human race. But while it happens that there is "enough and to spare" in this respect—for Nature is bountiful of her gifts—the bulk of every population under the sun, lives, to use a trite but true simile, "from hand to mouth." In all countries, but more especially in Christian England, it is the few only who may be said to "fare sumptuously every day." For "the hewers of wood and drawers of water," for those who ought to earn sufficient bread by the sweat of their brow, there is, unhappily, little save labour, travail, and deficient diet.

A few years since the Privy Council directed a medical inquiry to be made into the nature of the food upon which the poorer classes contrive to live. This was consequent upon the "Starvation Diseases," as they are termed, that suddenly supervened upon the Lancashire Cotton Famine. It was then found that more than a fifth of the agricultural population had less than the estimated bare sufficiency of *carbonaceous*, and more than a third less than the bare sufficiency of *nitrogenous* aliment; the standard in case of a man being 4,300 grains of carbon, and 200 grains of nitrogen. With a low diet necessarily follows physical deterioration. Surely, if any people may be said to dwell in the "valley of the shadow of death," it is those who drag on a lingering life of privation and misery,—for whom Charity has no pity; to whom Christianity holds forth no hope!

Unfortunately a large proportion of our town populations fare no better—possibly many of them fare far worse—while labour is superabundant, work precarious, and often ill-requited, provisions dear, clothing expensive, and rents high. The social philosopher, who roams about the secluded streets, lanes, and alleys of Britain's great metropolis, will see quite enough to convince him that there is "something rotten" somewhere; that the "body of our kingdom is distempered," needing something more than "good advice and little medicine" to effect a cure. He will observe numberless squalid houses, let out in tenements, thrown together in neighbourhoods the very atmosphere of which reeks with pollution. Stunted, deformed, diseased, horrifying specimens of humanity of all ages, will ever and anon meet his shrinking gaze; people on whose angularly-marked, pinched countenances, penury and privation are deeply and indelibly imprinted. And to what is this sad state of things mainly attributable? Why, to the deprivation of that food which is necessary to the due sustentation of animal life. That our London poor, more especially, are becoming daily deteriorated, is beyond dispute. The records of the public hospitals amply testify to the evil effects consequent upon a spare, coarse, and unwholesome diet. Poor married women suffer immeasurably from this cause, and, alas! convey the active seeds of congenital diseases to their unhappy offspring. The dregs of our population—and they may fitly be called "dregs"—are often condemned for flying to the gin-shop, and there expending their scanty pence in the purchase of alcoholic poison. But there is much to be said in extenuation of this terrible tendency. The absence of proper food, no less than the close, fœtid air they breathe, and the miserable dens they inhabit, produces an artificial, albeit unnatural, craving for stimulants, which they would be more than human could they resist. Joined to this, the physiologist Chossat[*] observes, from experiments made, "that insufficient nutriment produces an incapability of digesting even the smallest amount consumed, as though the vital powers were not able to supply the requisite gastric fluid when the body began to get enfeebled through insufficient nutrition." There is one remarkable characteristic of the semi-destitute poor of London, viz., that they evince dogged contentment with their pitiable and forlorn condition. This the late Dr. Southwood Smith[†] points out as being most fatal to any efforts made for their improvement, rendering their state hopeless, their condition chronic. No doubt it is through this dreadful indifference that the labours put forth by various philanthropic associations, to raise such out of the mire, fail of their effect.

Provided an ample supply of wholesome, nourishing food be not regularly received into the human system, the blood in time becomes impoverished. A variety of ailments supervenes. Not only does the sanguineous fluid turn watery, but diseased; and in lieu of being the fountain of life, it becomes metamorphosed into the stream of death. Why is it that scrofulous disorders are so rife among the children of the indigent? Why is it that they are wan, weak, and rickety; or that their growth is suddenly arrested? Simply because of deficient alimentation. Partially, I apprehend, to the like cause was attributable the ophthalmia which a few years since prevailed amongst the pauper school children at Mitcham, Islington, Anerley, and other places. The school managers refused to recognise the real cause of the infectious disorder, which may properly be charged to injudicious or deficient feeding, augmented by a foul atmosphere. According to the *Lancet*, "It is quite impossible to congregate this class of children in large buildings without giving rise to a disease which is the most delicate test of overcrowding and impure air."

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[*] "Recherches Experimentales sur l'Inanition." Cited by Dr. Carpenter.

[†] Health of Towns' Report.

In many instances the wages-earning classes do not get sufficient money to enable them properly to support life. This is due partly to the force of competition; partly to the fact of labour being a drug in the market. The chief necessaries of life having risen in price, add to the difficulty. As a rule, woman's work is ill paid. If entirely dependent upon their labour and earnings, the weaker sex find it hard to procure a bare sufficiency of the commonest and coarsest food. Then we must not overlook the so-called "genteel" orders, who, not unlike the honoured village parson immortalised by Oliver Goldsmith, are "passing rich" upon ridiculously small annual incomes. I speak of the general body of clerks occupied in merchants', lawyers', and government offices; albeit there is a host of needy professional men engaged in the like fierce strife,—namely, how to uphold social position and respectability upon inadequate resources. To achieve these objects, however partially, pre-supposes no slight self-denial, involving, in fine, sheer deficiency of diet, and the grave results that ensue. "When," remarks the *Times*, referring to the Food Question, "it is considered that within the memory of man the greater part of the population of this island were unacquainted with good wheaten bread, that only a generation ago the potato was the food of Ireland, and that fresh animal food is still the luxury of the few,—when, too, it is further considered that with poverty of food there comes poverty of spirit, reaching to body and soul,—the food supply becomes a great moral and political question." And that such is the case none can gainsay. If "Righteousness exalteth a nation," so does an adequate supply of food, easily obtainable, preserve a nation. I shall conclude this "Paper" in the words of Dr. W. Brinton:*—"Our choice of the exact quantities and qualities of alimentary substances necessary to construct a perfect scale of diet may, indeed, be sometimes explained by chemistry; but it must always be dictated by experience: and the dietaries of gaols, workhouses, and hospitals, corrected as they have too often been by the ghastly hand of Death himself, have fixed the limits of the food necessary for health with an accuracy which, considering the price of human life that has been paid for it, ought surely to satisfy the most rigid economist."

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* Cyclopædia of Anatomy and Physiology, vol. v., p. 397.

CHAPTER III.

BREAD.

THE Saxon "breod," or bread, is derived from the verb "brodan," to nourish. Hence this important, if not indispensable, article of human consumption is aptly denominated the "staff of life"—

> "Bread, that decaying man with strength supplies."

Singular to say, to no chemist of ancient times are we indebted for the discovery. The alchemists of old wasted their energies and shortened their lives in the vague endeavour to transmute the baser ores into gold, as though the "precious metal" were the "be-all and the end-all" of existence. But bread is incomparably a richer boon to mankind. "Without bread," observes Dr. Cullen, "or somewhat analogous to it, no nation is known to live." It is chiefly to the industry of man we are indebted for this invaluable addition to our *Materia alimentaria.* According to Dr. Darwin, the art of feeding mankind upon so small, and seemingly insignificant, a grain as wheat, was discovered by the Egyptians, who gave it the immortal name of Ceres; so that the polished nations of antiquity held the *Sacra Cereris* in high estimation. To have brought bread to its present condition, has been the assiduous labour of ages.

It would seem, however, as though the Divine Author of Nature had so constructed the human organism that life may be sustained, without absolute injury, by every kind of aliment, to any of which the system becomes gradually accommodated. Some ancient nations were accustomed to range over fields and forests in search of food, devouring with avidity, like the lower animals, whatever wild herb they could find :—

> "Quod sol atque imbres dederant, quod terra crearat
> Sponte suâ, satis id placabat pectora donum." *

The Esquimaux feed voraciously on the walrus; the Bramins of India, and the inhabitants of the Canary Islands, Brazils, and other countries, live almost entirely on herbage and roots; the Kamtshadales are often compelled to support life on fish-oil, which they form into a paste with sawdust or the rasped fibres of certain plants. The British aborigines, when first visited by the Romans, knew not so much about the cultivation of the ground as did many of the Indian tribes in America. If the testimony of Cæsar, Strabo, Diodorus Siculus, and other writers of antiquity be of any weight, our progenitors subsisted chiefly upon flesh and milk. The inhabitants of Lapland are necessitated to improvise a sort of bread out of dried fish, mixed with the powdered bark of the pine tree—a "counterfeit presentment" truly. The Norwegians concoct their bread by the admixture of barley and oatmeal, which they bake between two hollow stones,

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* Lucret. lib. 5, l. 935.

when the modern mystery of "panification" is completed. This compound seems almost incapable of deterioration; for at the baptism of a child bread is produced, which, in all probability, had been baked at the christening of the infant's grandfather. Owing to the failure of the crops in the northern districts of Finland during 1867, one night's frost plunged the whole country into misery, famine, and despair, introducing the "famine typhus," and making fearful ravages amongst the starving thousands, rich and poor, when one-tenth of the population fell victims to this epidemic. Then the bread given to sustain life was composed of pease-straw combined with Iceland moss, and a very small proportion of flour. Even the root of the *Butômus Umbellatus*, without any admixture of flour, had to be resorted to, and with advantage, although this water-plant was scarce. As a last resource, a bread was actually baked and distributed to the famishing people, the constituent parts of which consisted of two parts clay and one part flour.*

The natives of Whidah (coast of Guinea) make their bread from Indian corn, which they, in really primitive fashion, grind between two stones, named the *Kankistone* and the *rubber*. The former, on which a small quantity of corn is placed after it has been for some time soaked in water, is smooth and broad; the latter is then employed until the corn is reduced to meal by the two-fold process of bruising and friction. The dough thus formed is made into circular lumps, which are either boiled in an earthen vessel, or else baked over the fire on iron or stone. The bread thus rudely manufactured is termed *Kanki*, which, combined with a little palm-oil, forms the chief diet of the people.

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* Mr. Consul Campbell's Report on the Trade of Finland for 1867.

In ancient times various materials were converted into bread, such as potatoes and different kinds of earth; while, during the siege of Paris by Henry IV., the bones of charnel-houses,—shocking to relate!—were brought into requisition for this purpose. So scarce had bread become at one time in France, that people of the highest quality were wont to carry pieces of it with them when they were invited out to dinner. Even in England, on the authority of a trustworthy writer, bread had to be manufactured "of such grain as the soil yieldeth; nevertheless, the gentility commonly provide themselves sufficiently of wheat for their own tables, while their household and poor neighbours in some shires, are enforced to content themselves with rye or barley; yea, and in time of dearth, many with bread made either of beans, peas, or oats, or of altogether, or some acorns among."* A peculiar bread called *Militaris*, was at one time prepared by soldiers and officers while in camp. For this purpose hand-mills were occasionally employed. The general practice, however, was to pound the corn in a mortar, when the meal would be mixed with water, made into a cake, and afterwards baked on live embers.

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* Holinshed's Chronicle.

According to Stowe, bread derives its name from the place in which it was formerly sold; "for," he observes, "it appeareth by records that in the year 1302, which was the thirtieth of Edward I., the bakers of London were bounden to sell no bread in their shops or houses, but in the market." By a royal mandate, issued by Henry III., in the thirty-sixth year of his reign (A.D. 1252), bakers were ordered not to impress bread intended for sale with the sign of the cross, Agnus Dei, or the name of Jesus Christ. By virtue of an Act of Henry III., passed fourteen years after that just referred to, and entitled *Assisa et Panis et Cervisiæ* or "the Assize of Bread and Ale," the prices of these articles were regulated by those of corn. Owing to a provision of the same statute, a baker was fined for transgressing the law, and in case of a heinous offence was ordered to suffer punishment of body in the pillory, or some other severe correction. I may venture to say, *en passant*, that I regard the discarded pillory as a punitive measure worthy of being restored to the nation. It would be admirably adapted for such daring offenders as swindle the public by the double mode of adulterating food and giving light weight. Both the enactments mentioned were successively repealed in the times of Queen Anne and George IV. The first assize of bread was proclaimed in the reign of King John.

Attempts have been made to render wood-fibre alimentary, and with a certain degree of success; but the process is so troublesome and expensive that it can never supply a common article of food. The experiment was first tried by Professor Autenrieth of Tubingen. The chief difficulties he sought to overcome were the treatment of the fatty matters contained in the woody-fibre, and the compact aggregation of the material itself. Hence he rejected such woods as the fir and the oak; the former owing to the resin it contains, the latter in consequence of its astringency. The birch and the beech he considered best adapted for his bread experiments, as possessing little taste or smell.

The first operation was to reduce the wood, not into fine fibre merely, but to an absolute powder. Then it was submitted to the repeated action of the heat of an oven, which was supposed to have rendered it more digestible, as in the case of coffee. Prepared in this way, wood is said to acquire the smell and taste of corn flour, albeit it retains a yellowish appearance. Like corn flour, too, with the addition of leaven, it makes a perfectly uniform and spongy bread, and when thoroughly baked and rendered crusty, is not by any means unpalatable, and perhaps not very unwholesome, and preferable to the bread concocted in times of scarcity from bran and corn husks. A somewhat lengthy and interesting account of Professor Autenrieth's various experiments may be found in the *Edinburgh Magazine*, vol. i. (1817).

On the 17th June, 1824, bread was first ordered to be sold by weight in London; and an Act passed in the reign of William IV., which came into operation on 1st October, 1836, extended the same practice to the provinces. By an enactment of Victoria (July 4, 1838), all former laws relating to the sale of bread in Ireland were repealed, and a new assize established in that country. And here it may not be inopportune just to note the fluctuations in the prices of bread since the year 1754. At this epoch the cost was 4*d.* per quartern loaf. In 1757 it rose to 10½*d.* During 1800 (when new bread was forbidden under a penalty of 5*s.* the loaf, if sold under twenty-four hours old), it had increased to 1*s.* 5*d.* In January, 1801, it was 1*s.* 11*d.*; in July, 1810, it advanced to the high figure of 2*s.* 5*d.*; in 1823, it declined to 10*d.*; and in 1833 to 8½*d.*, about the price at which the quartern loaf ranges at present. Cheap bread is an inestimable boon, being the infallible indicator of social prosperity and augmented domestic comfort. Singular to observe, the low price of bread, (which necessarily is dependent on the current value of wheat) materially influences the marriage market, to use a commercial if not a comely metaphor. When bread stands at an unduly high figure, a remarkable falling-off occurs in marital alliances. When the commodity is cheap, it very sensibly affects the Registrar-General's Returns in this particular. "The doctrine of the soundest writers," remarks a shrewd political economist, "on the theory of population, has established the law which connects the increase of the human race with the supply of food; and the tendency of population to outrun the supply of food is one of the chief dangers of society, and the chief causes of distress."

Of all the industrial arts, none has made so little progress as that of "panification," or bread-making, although

> "To their ruin, every age
> Improves the arts and instruments of rage."

Century after century, whilst the marvels of human ingenuity have been steadily advancing and civilising mankind, this alone has remained almost stationary. With few creditable exceptions, those who supply our tables with the "staff of life" pursue the old barbarous modes of trituration and amalgamation of the materials, a process scarcely differing from that in vogue during the primitive times of Fabricius and Cincinnatus, which has caused a foreign author to remark: "We have become Titans through the medium of science, which nevertheless has not given us bread worthy of man." The ordinary method of bread manufacture is not only coarse, filthy, and disgusting, but is fraught with fatal consequences to those engaged in this—as at present pursued—demoralising and health-destroying occupation.

As one of the class of "white slaves," the journeyman baker stands prëminent. From the hour of eleven at night until five, six, or seven o'clock in the morning, and occasionally for a much longer period, this helpless victim of a "social evil" plies his laborious and unwholesome handicraft, and for a pittance varying from 10*s.* to 1*l.* 10*s.* per week, the *maximum* reward of such incessant drudgery. Half-naked, in a highly-heated, pent-up, underground room, the atmosphere of which becomes densely impregnated with insidious particles of flour, he toils with his hands—ay, and even with his feet—until the perspiratory fluid rolls in thick drops from his exhausted body, kneading the tenacious dough that is to form important human food. As Nature will not brook so flagrant and systematic a violation of her righteous laws, so the avenging Nemesis of justice, slowly, perhaps, but surely, pursues the transgressor. Overwork and impure air, combined with an unhealthy occupation, soon tell their sad tale upon the wretched journeyman. He is struck down ere he reaches the prime of life, while his family have no alternative but to beg their bread or seek the miserable refuge afforded by the parish. It is an unquestionable fact that there is a far higher mortality among bakers than among the operators of any other unhealthy calling, not excepting miners, knife-grinders, stone-masons, or silk-printers. According to the most reliable statistics, I find that (exempting all youths connected with the trade who die before they reach man's estate) the average period of life attained by the journeyman baker is but forty-two years. Coupled with this excessive mortality, the ordinary existence of the wretched baker is but a protracted condition of ill-health, not unfrequently terminating in consumption, which Dr. Letheby emphatically terms "the malady of bakers!" Some master bakers, to their credit be it said, have abolished the system of night-work in their establishments; an example which is not likely to be widely followed.

But among the host of disorders attendant upon the occupation of a baker, there is notably one which, however repugnant, nay loathsome, in itself, is yet necessary for the bread-consuming public to know. I allude to the cutaneous disease characterized by the vulgar epithet of "the baker's itch," which principally affects the hands and arms of the operatives, and apparently arises from the constant contact of those members of the body with bread ingredients and the fermentative condition of the dough; the presence of saline particles greatly aiding the development of that disgusting eruption. Surely if it were needful for the Legislature to interfere in the case of factory workers, in order to save them from the grinding tyranny and rapacity of some heartless task-masters, the majority of operative bakers have not less claim upon the sympathy of the nation, and the interference of the State. But, if not on humanitarian grounds, assuredly regard for cleanliness and decency should induce the public peremptorily to demand a less objectionable system of bread-manufacture than that which at present obtains.

In treating of this subject, under the title of "Our Daily Bread," the *Medical Examiner*, remarks:—"It may be asserted without hesitation, that pure bread is impossible under the practice of 'flesh dough-kneading.' The greatest care and cleanliness cannot prevent the perspiration of the workers from falling into the kneading-trough, nor their cast-off epithelium from becoming incorporated with the dough. It is not pleasant to think that our daily nutriment contains what is not very different from the sweepings of a Turkish bath; but such is, nevertheless, the case, even where our bakers are the cleanest of mankind. Where they are dirty, as we fear many of them are, the impurities in bread are increased tenfold. The bake-houses are allowed to remain in a filthy condition. Cobwebs hang in strips from the rafters, ready to fall at the slightest tread on the floor above. Rats, cockroaches, beetles, and other vermin infest the floor, and make playful incursions into the kneading-trough and the flour sack. Sewer gas and the exhalations of the workers remain pent up in the filthy cellar, and are greedily sucked in by the porous dough. The water which is used in making the bread is taken from a reservoir which is exposed to the same effluvia, and to the same dirt, and which is seldom if ever cleaned out. The flour, too, remains for days in the same horrid den. The bakers add their share to the general 'dirt pie.' Perspiration and used up epithelium are, as we have shown, unavoidable ingredients. Hairs and head scurf, nasal and pulmonary excretions, and the chance dirt which may collect upon them are avoidable, but, we fear, not always avoided evils. To this burden of horrors we may add that kneading with the feet is not altogether unknown."

Fifteen years ago a laudable effort was made by Mr. Stevens, a master baker, of Hackney, to improve the physical and moral condition of the operative baker. With this end he invented and patented an ingenious machine for kneading dough, which altogether dispensed with hand labour, so far, at least, as the process of what is technically termed "mixing" is concerned. It is rather inexplicable that such a machine had not been invented some centuries previous, but still more surprising that, having once been invented, it is not universally used. Notwithstanding the unquestionable advantages of machine over hand labour, especially in the manufacture of bread, scarcely a score out of nearly three thousand master bakers in the metropolis bring this humanising agency into requisition. What more striking proof could be cited of the desperate tenacity with which men cling to old systems and preconceived prejudiced opinions?

Merely on the grounds of health and cleanliness, machine-made bread must be considered preferable to that manufactured by hand. But the new system of panification offers several other important advantages. The bread thus produced is superior in quality, whiter in colour, sweeter to the taste, considerably more substantial, and less liable to waste by crumbling than that formed by the ordinary process, while it creates a saving of bread material to the master baker of nearly 12 lbs. on a sack of 280 lbs. The machine being enclosed while in action, prevents the farinaceous matter from wasting, and thus dispenses with "sweepings," as none are made. The "sweepings" of an ordinary bakehouse are considerable. When we consider that flour costing from 47*s*. to 50*s*. per sack is re-sold in an impaired condition for 12*s*. per sack, the loss must be somewhat serious; to compensate in a measure for which, as well as to remedy imperfect trituration, adulteration is frequently and freely resorted to. Although the bread machine produces a great saving of labour —inasmuch as the mixing process is performed more thoroughly and quickly thereby—nevertheless it does not operate injuriously against the journeyman; a similar number of "hands" being required in those bakehouses where machinery is used as where hand labour is exclusively employed.

Dr. Dauglish's improved and scientific mode of bread manufacture, which for years past has been adopted by the "Aërated Bread Company, Limited," is denominated the "aërated" process. This system bids fair to entirely revolutionise the baking trade. It is well understood that the formation of good bread mainly depends upon a chemical transformation of its constituent properties. Originally, mankind prepared their corn by simply boiling it, thus forming viscous cakes—a food anything but palatable or digestible. In course of time it was discovered that flour mixed with certain quantities of warm water and yeast produced an alcoholic and panary fermentation, which not only destroyed its viscidity, but rendered it light, when properly triturated, exposed to prolonged warmth, and subsequently baked. A similar process of preparing the "sponge," although necessitating from eight to twelve hours' labour, continues in general usage at the present day. Dr. Dauglish's system entirely dispenses with an obstruction so formidable and yet so unnecessary, in the production of our "daily bread." The generation of carbonic acid gas, by means of fermentation, imparts to the sodden lump of flour and water a vesicular character, while it effects a transformation in the starchy and saccharine properties of the flour itself, destroying in a great degree the nutritious qualities of the gluten. By the new process, carbonic acid gas is artificially produced, then stored in an ordinary gas holder, and finally pumped into a cylindrical tank of water. This charged water is subsequently mixed, under pressure, with the flour, when "dough" is produced. After having been kneaded by the arms of the iron "mixer," from five to ten minutes, it is drawn or pressed into loaves of the regular shape, and duly baked, never once being touched by the hand.

The alleged advantages of the new method of bread-making consist—first, in the cleanliness of the process; secondly, in the rapidity with which flour and water are formed into bread; thirdly, in preserving the flour from deterioration, which it notably undergoes during the fermenting process; fourthly, in producing certainty and uniformity in the production of good bread, and obviating the vagaries and irregularities to which the old system is frequently liable; fifthly, in rendering the bread thus made more wholesome and digestible—it being admitted by eminent chemists that the *débris* of the yeast is more or less constitutionally injurious; sixthly, in superinducing immense economy of labour and health, while it changes bread-making from a domestic manual toil to manufacturing machine work, and transforms operative bakers from mere human, over-driven drudges into intellectual and healthy labourers.

The honour of having first made wheaten bread was claimed by the Athenians. According to their mythological story it was they who taught the use of it to mankind. In the historical age *gourmands* considered the common wheaten bread made in Athens superior to any in all Greece. Bread was the staple article of food for the large population of Attica, which, in prosperous times, numbered 520,000 inclusive of the slaves, who formed four-fifths of the community. About 600,000 quarters of wheat were consumed annually. A goodly portion of this was imported from foreign countries, especially from the Black Sea,*—according to Strabo, the Tauric Chersonese, now known as the Crimea, with which this nation has, unfortunately, made unpleasant acquaintance, and which is fraught with sorrowful no less than with glorious recollections.

I shall conclude my "Paper" on Bread, by mentioning a few of the ancient and modern practices to which this indispensable article of food has given rise; showing, moreover, how the elements of Pagan superstition still linger among us, and are even inseparable from Christian rites. It was once customary in several parts of England for persons in affluent circumstances to distribute "Soul Mass Cakes" among the poor. In return for this charity the recipients were bound to repeat the couplet—

"God have your soul,
Beens and all."

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* Economie Politique des Romains, par M. Dureau de le Malle.

These cakes were large and of triangular shape, and had to be eaten on Allhallows' night.

A similar observance obtained at burials, when *arvil-cakes*[*] were distributed with profusion. The North of England folk were most addicted to the practice, so that Morésin, referring to funeral entertainments, remarks, "that to bury a dead wife cost as much as to portion off a daughter." I am glad to find that the London Necropolis Company, by its admirable system of interment, which does not necessitate mourners to meet at the late residences of the dead, has done, and is doing, much to render the obnoxious custom ultimately obsolete. The practice is clearly traceable to the Greeks, who, on the decease of a person, were wont to give a supper-entertainment known as *perideipnon*, to which Cicero applies the term *circompotatio*. Dr. Chandler[†] describes a funeral entertainment he witnessed amongst the natives of Greece. He observed two persons follow the body "carrying on their heads each a great dish of parboiled wheat," which was "deposited over the corpse." In harmony with this custom S. Gregory asserts that it was a rite approved of by the Eastern Church to set boiled corn before the singers of the holy hymns which were chanted at the commemorations of the dead.

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[*] This word occurs in the provincial poem entitled "Yorkshire Ale":—

> "Come bring my Jerkin, Tibb, I'll to the *Arvil*,
> Yon man's ded seny scoun, it makes me marvill."

[†] Travels in Greece.

This Father interprets the ceremony as being significant of a future life.*

A particular charm has, for some indescribable reason, been connected with corn when made into the form and consistence of bread or cake. Cowel,† defining the word *Kitchell,* observes: "It was a good old custom for godfathers and godmothers every time their godchildren asked their blessing to give them a cake, which was a God's-Kitchell. It is still a proverbial saying in some counties, 'Ask me a blessing and I will give you some plum cake.'"

A curious and certainly a rare book was printed in London, A.D. 1537. It is entitled "A Werke for Householders, by a professed Brother of Syon." Therein mention is made of a charm then in vogue as a specific for all disorders. This is the quaint description:—"The Charmer taketh a pece of whyt Breade and sayth over that Breade the Pater Noster, and maketh a Crosse upon the Breade, then doth he lay that pece of Breade unto the Toth that aketh, or unto any Sore tournynge the Crosse unto the Sore or Dysease, and so is the persone healed." I wonder if nostrum-mongers made such fortunes in those days as they do in modern times? Again, in Herrick's "Hesperides," we have a recipe for keeping off spectres of the night:—

"Bring the holy crust of bread,
Lay it underneath the head;
'Tis a certain Charm to keep
Hags away when children sleep."

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* Greg. Opuscula.

† Law Dictionary.

It is strange how far back we can trace certain modern observances. Even a prophet had to reprove the Israelitish people for following superstitious practices: "Seest thou not what they do in the cities of Judah and in the streets of Jerusalem? The children gather wood and the fathers kindle the fire, and the women knead the dough to make *cakes* to the queen of heaven,"[*] et cetera.

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[*] Jeremiah vii., 18.

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CHAPTER IV.

SALT.

THIS invaluable ingredient of human food is not only found in every animal and vegetable product, but abounds in immense and exhaustless masses in the earth, constituting rocks of considerable extent, supplying numerous salt-springs and lakes, and furnishing the mighty waters of the ocean with a sufficient supply of salt for human purposes, even if no other source existed. The most notable salt mines and works are those of Wrelicska, in Poland; Catalonia, in Spain; Louvre, in Hungary; Altemonte, in Calabria; Hallein, in Upper Austria; Tunis, in Algiers; and, though last, not least, Cheshire, and Worcestershire, in England. In the former, brine pits were wrought in the time of Edward the Confessor; and in the latter, salt works have been in operation since the time of the Romans.

The salt works of Wrelicska are very extensive, the subterraneous excavations branching out for several miles. Thousands of workpeople are employed therein; while numerous dwellings, and even some chapels, are formed in the solid rock. The salt mines of Hallein, which comprise part of the

Duremberg mountain, are likewise remarkable. They present the appearance of a honeycomb, having been worked for fully five hundred years. An interesting account of these mines and of the adjacent Noric Alps, which fringe the beautiful valley of the Salza, may be found in Barrow's "Tour in Austria and Lombardy." In some of the places enumerated the rocks consist of entirely pure salt. The rock salt from which the brine is drawn at the works of Mr. Corbett, M.P., at Stoke Prior, Worcestershire, is of this description, being as clear as crystal. These brine pits are the deepest and most costly in England.

The chemical constituents of salt consist of a compound of chlorine and sodium. The ordinary culinary salt, when in a state of purity, is technically termed muriate of soda, or chloride of sodium. A large proportion of deliquescent salts, as well as sulphate of magnesia, pervades the Scotch common salt, while that manufactured at Lymington contains a similar amount of impurities. There are different kinds of salt, and different modes of manufacturing it. For example:—

1. Bay salt, which consists of two kinds, the one prepared by evaporation from sea-water; the other from salt springs and lakes. The former method is practised in Hampshire, France, Spain, and Portugal; the latter in the islands of Cape Verd, and many parts of America.

2. Marine, or Newcastle salt, which is extracted from sea-water when boiled.

3. Brine, or fountain salt, prepared in a similar manner from brine, taken from rivers, lakes, &c.

4. White salt—one kind prepared from sea-water, after having been subjected to the sun's heat and exposed to the air; another kind, extracted from sand or stones impregnated with saline particles.

5. Refined rock salt, boiled from a solution; and finally,

6. Salt-upon-salt, procured from an amalgamation of bay and other salts, and much used by the Dutch in preserving herrings.

Most of the above-mentioned preparations are comprised by Dr. Brownrigg under the denomination of *white salt*, although the different conditions in which these salts are held have obtained for them distinguishing appellations, such as baked or loaf salt, common salt, fishery salt, and shinery salt. The first of these is manufactured in Cheshire and Worcestershire, and being of the finest, whitest, and driest quality, is best adapted for table purposes. The last kind, owing to its possessing a larger and firmer grain, is chiefly and most usefully employed in the preservation of meat. Dr. Henry, however, includes these varieties under four denominations, viz., stoned or lump, common, large-grained flakey, and large-grained fishery salt. Dr. Brownrigg, to whom I have referred, is the inventor of an artificial method of promoting the evaporation of sea-water.

The process adopted at the Cheshire and Worcestershire works in the manufacture of stoved, loaf, or table-salt, is as follows:—The liquid, termed brine, having been pumped up from the brine pits into a reservoir, is conveyed into wrought iron pans, rather shallow, but of large surface, placed over fires, and subjected to a temperature of 226°, just 14° above the boiling point of water, the presence of saline particles considerably inducing this intense heat. As the brine becomes hot, a white substance, similar to powder, accumulates on the surface. A deposit is made at the bottom of the pan, called "pan-scale," and this would contain any foreign matter which might be present. The salt lying above it would therefore be comparatively pure. After a while the liquid becomes clear, crystals of salt form on the top, and in eight or ten hours are precipitated to the bottom of the pan by force of their accumulating specific gravity, the principal part of the water meanwhile having undergone evaporation. The draught is then "cleared" from baskets or "barrows," so that the fluid portion may entirely drain off. It is next moulded like loaf sugar and placed in stoves till thoroughly dry.

The common fishery, and other descriptions of salt, are prepared in a similar manner. The only difference is that they are not "stoved" after drainage, and that the evaporating process is conducted more slowly and at a much lower but variable temperature. For the purpose of drying the unstoved salt, it is placed in store-houses on sliding boards, called "drabs." After three or four days the brine becomes perfectly drained off. Sometimes, however, wooden troughs, perforated at the bottom, are employed for this purpose. In several of the extensive salterns of England, Scotland, and the continents of Europe and America, the evaporation of brine is superinduced by artificial heat. This process occasions a vast pecuniary saving in the cost of the manufactured article ; a consideration by no means to be despised on various grounds.

Early in the eighteenth century, a reward was granted by Parliament to one Mr. Lowndes, of Cheshire, for improvements which he effected in the preparation of salt. Owing to the repeal of the duty on this commodity, the Cheshire manufacturers are enabled to sell the article at the very lowest rate of profit, so that the proprietors of other salterns cannot possibly compete with them in the open market. Cheapness of coals, facility of conveyance, and the natural chemical qualities of the brine employed, are doubtless all in favour of Cheshire manufactured salt. The Cheshire and Worcestershire salt certainly cannot be excelled for fineness of grain, whiteness of colour, and general chemical purity. The works of Mr. Corbett, in Worcestershire, are considered the model Salt Works of Europe. The salt is unsurpassed in colour and purity, and medals have been awarded for it at the great International Exhibitions in different parts of the world. The first salt mines in Poland were discovered at the close of the thirteenth century, but those of Staffordshire were not known for about four centuries afterwards.

If for no other reason, salt is remarkable as constituting the only mineral eaten by man. Not only does it afford an indispensable and wholesome condiment for our tables, but it forms an essential constituent of the blood, and supplies to the human system the loss sustained by saline secretions. Hence the desirability of its purity. It is grateful to the lower animals, and even to birds. For this cause the "salt licks" and salt lake springs of America are frequented by herds of buffaloes and other quadrupeds, as well as by myriads of doves, whose dulcet and plaintive notes are heightened by its effect. Indeed the virtue said to reside in the famous Cheltenham springs was first discovered by the owner of the property having noticed the resort of pigeons to the spot. From time immemorial salt has been successfully applied to sundry economical uses. Its antiseptic properties are invaluable; consequently, it is universally employed in seasoning or "curing" animal and vegetable substances.

Common salt is applied to very diverse uses. Besides being advantageously and universally employed in the preparation of meat, fish, and vegetables for human food, its acid and alkali are found to be essential in several chemical operations. It serves, for example, to fuse glass, which it purifies and whitens; facilitates the precipitation of the metallic parts of minerals in assays; is considered a successful remedy for the bites of venomous reptiles; and is employed, in conjunction with brandy, in choleraic affections. Several years since, Dr. Stevens, of Barbadoes, wrote a treatise on its curative properties, entitled "Salines in Cholera."

When the fell Asiatic pestilence first visited these shores, brandy and salt was the popular remedy against its insidious action, and marvellous were the reputed cures thereby affected. On the testimony of Boyle, "One of the eminentest physicians of London was wont, as an excellent secret, to employ in some of his choice remedies, that kind of saltpetre which he drew out of earth digged up in *churchyards*."

The peculiar antiseptic properties of salt, according to Sir Humphrey Davy, consist in the singular attraction which it possesses for water—so potent a decomposing agent—and in its capacity to exclude air. Its medicinal qualities are also peculiar. While all other saline preparations tend to cool, this but heats the body, and engenders thirst. Some years ago a medical man wrote a *brochure* in which he condemned the use of salt, attributing to it all the diseases to which flesh is heir. The poor fellow eventually committed suicide. Not very long since a book appeared in which the writer, who is a physician, recommends salt, as a sure antidote to the contagion of small-pox. Doctors of course will disagree; but as *variola* is acknowledged to arise from a diseased or poisoned condition of the blood, the due use of salt may possibly form a safe and effective specific.

Salt is not only an agreeable condiment, but also an indispensable requisite. When moderately used it acts as a gentle stimulant to the stomach, and gives piquancy and relish to our food. In Africa the high-caste children suck rock-salt as if it were sugar, although the poorer classes of natives cannot so indulge their palates. Hence the expression in vogue amongst them, "He eats salt with his victuals," signifying that the person alluded to is an opulent man. In those countries where mineral salt is not procurable, and where the inhabitants are far removed from the sea, a kind of saline powder is prepared from certain vegetable products to serve in its stead. Indeed, so highly is salt valued in some places—such as Prester John's country—that from its very scarcity it is employed as a substitute for money. The eminent African explorers, Mungo Park and Burchell, make mention of the serious inconvenience which the prolonged absence of salt occasioned their parties. The former remarks, that "the long use of vegetable food creates so painful a longing for salt, that no words can sufficiently describe it;" while the latter avers that he had sent ninety miles for a gallon of salt, which both himself and his companions regarded as a "valuable acquisition."* So severe has the deprivation of this saline mineral been considered, that the ancient laws of Holland ordained that prisoners should be kept on bread alone, *unmixed with salt*, as the extremest penal punishment. However, the consequences were so alarming to the criminals thus tortured, that this inhuman injunction had to be rescinded. Many of the wretched creatures died from the effects of *entozoa* engendered within their stomachs.

Having so far treated of the preparation, qualities, properties, and uses of salt, I proceed finally to notice some ancient and modern customs, observances, and popular superstitions connected with this invaluable product of Nature.

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* Travels in South Africa.

Salt, from the remotest period, has been employed in sacrificial rites; a circumstance which invests it with more or less of a sacred character. According to the Mosaic ordinances salt was required to be sprinkled on all flesh offered in sacrifice, and hence it was designated "the salt of the covenant." Among the Greeks and Romans salt was not only employed as an inseparable adjunct to their bloody sacrifices, but was itself offered as a propitiation when no animals were slain. Thus in the Ferialia, or offerings to the Dii Manes—designed to redeem from the vengeance of the Stygian or infernal deities—the Romans simply used salt, mixed with a small portion of flour:—

> "Parva petunt Manes, Pietas pro divite grata est
> Munere, non avidos Styx habet una Deos,
> Tegula porrectis satis est velata Coronis,
> Et parcæ fruges, parvaque Mica Salis."

In the Lemuria—another festival to the same Dii Manes—beans were substituted instead, the celebrant repeating these words:—

> "His inquit, redimo, meque, meosque fabis." *

Salt was likewise mixed with the sacrificial cakes used by the Greeks and Romans. It became an

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* "And with these beans I me and mine redeem."

essential concomitant of their lustrations, which, says Tennant, "gave rise in after times to the superstition of holy water." Much reverence was consequently attached to it, and great was the veneration in which it was held both by priests and people.

Selden observes of salt that it "was used in all sacrifices by express command of the true God; the salt of the covenant in Holy Writ; the religion of the salt, set first, and last taken away, as a symbol of perpetual friendship; that in Homer the phrase is used 'he sprinkled it with divine salt.' In the title of *agnites*, the cleanser, given it by Lycophron, you shall see apparent and apt testimony of its having had a most respected and divinely honoured name."* For several centuries salt has been used in the services of the Latin Church in the performance of baptism, no less than in the consecration of holy water. In the former instance the "parva mica" is taken from a gold or silver box and deposited in the child's mouth, the priest observing the while, "Receive the salt of wisdom, and may it be a propitiation to thee for eternal life."

In a symbolical and metaphorical sense salt is frequently used by profane and sacred writers. At a very remote period it was regarded as an emblem of extreme sterility, while kings and conquerors, like Abimelech, after the sacking of a city, scattered salt over it.† Grounds have also been sown with salt to render them barren.* In the prophetic denunciation against Moab, "Salt-pits and a perpetual desolation" form one of the curses uttered against that land.† During the December of 1596 a popular tumult occurred in Edinburgh. On the 1st January following, what are described as ferocious brigands thronged the thoroughfares, gloating over the fell prospect before them, and ready when the sovereign (King James) gave the word to "sack, raze, and plough the capital, and sow it with salt."‡

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* Notes on the Polyolbion, Song xi.

† *Vide* Judges ix. 45.

Some eminent writers of antiquity touch disparagingly upon what they term salt soils. Virgil, for example, reprobates a salt soil as occasioning the deterioration of fruit trees, and as one admitting of no amelioration even from the plough. Pliny considers every place in which salt is discovered as destructive to vegetation. Modern science, however, has set these questions at rest, as it demonstrates the futility, not to say absurdity, of such opinions, no matter from how high a source they emanate. The water of salt springs, sea sand, and even refuse salt, is now frequently and advantageously employed as manure in this and other countries. Indeed, ever since the time of Henry I. salt has been used as an artificial stimulant to the earth, especially on the Cornish coast, and with marked advantage. Naturally, in such cases, it needs to be dispensed with careful discrimination ; for if not judiciously applied it would become more injurious than beneficial; nay, prove a potent poison to vegetables. The Egyptians, apparently, had such an abhorrence of salt that, according to Plutarch, they regarded it as the spittle or foam of the giant Typhon, the dreaded enemy of their cherished divinities.

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* Deut. xxix. 23.

† Zephaniah ii. 9.

‡ Woodrow's Life of Bruce, prefixed to Bruce's Sermons. Edin. 1843.

Salt has long been regarded as emblematic of wit, wisdom, and intelligence. Hence the "Attic salt" and the ceremony of "Depositio," among the scholars of Strasburg University, so late as two centuries ago. Thus observes one of the professors of that famous seat of learning: "With regard to the ceremony of salt, the sentiments and opinions, both of divines and philosophers, concur in making salt the emblem of wisdom or learning."* Eternity and immortality have likewise been symbolised by it. "The devil," quaintly remarks an old divine, "loveth no salt in his meat, for that is a sign of eternity." † Salt has also been regarded as typical of hospitality and fidelity. The partaking of bread and salt has from time immemorial been used as a form of oath. The "Covenant of salt" has not alone been confined to the Jews. It is still adopted by the Arabs, and was even practised in England as late as the sixteenth century. Hence, Decker, the dramatist, makes one of his characters say:—

> "He tooke bread and salt by this light, that he would
> Never open his lips."

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* Dyas Orationum de Ritu Depositionis.

† Reginald Scot's (citing Boden) Discourse upon Angels and Devils.

Some of the Tartar tribes are wont, when they set out on a journey, to carry a portion of salt in a small bag attached to their saddle, as a solace for themselves and as an offering and pledge of friendship to those they may encounter on their way. The Muscovites considered that a prince could not manifest a stronger mark of affection than by sending salt from his own table to his friends; while Pennant asserts that "a tune called *Gosteg yr Halen*, or the prelude of the salt, was invariably played whenever the salt-cellar was placed before King Edward's knights at his Round Table."*

In England important festivals were formerly held in honour of salt. Every Ascénsion Day the old inhabitants of Nantwich made great rejoicings with this object, when hymns of thanksgiving were sung for "the blessing of the brine." On these occasions one particular brine pit, held in especial veneration, was bedecked with boughs of trees and garlands of flowers, around which lads and lasses indulged in the reveries of song and dance. The triennial ceremony recently revived at Eton, called *Montem*, held on Whit-Tuesday, was, however, the most remarkable. Salt-bearers and scouts, attired in motley-coloured but expensive silk costumes, preceded the Etonian procession, and collected the usual contributions in money. Each person carried salt in a handkerchief, from which the passing traveller had to take a pinch ere he paid his dues. Now and again these scouts extended their pleasantries beyond all legitimate limits, for upon encountering any boorish rustic who wanted anything in return for the trifle he had bestowed, they would directly fill his mouth with salt, to the infinite merriment of the spectators. When the procession reached Salt Hill the Etonians solemnly paraded round its base, when a religious ceremony was performed by a priest. Large offerings of money were then collected, which became the property of the "captain" or "senior of the collegers," at the time. The presence of Royalty frequently graced the *Montem*, thereby giving prestige to, and enhancing the value of, that

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* Tour of Wales.

"Long-famed triennial fête."

On Whit-Tuesday, 1790, according to authentic records, five hundred pounds were collected at the festival, their majesties subscribing fifty guineas each. The *Montem* is said to have originated with the monks for the purpose of raising contributions by the sale of salt. From the profits on this commodity Salt Hill and other valuable lands became the property of the college.

The superstitious observances with regard to salt are numerous, some of which obtain, at the present day, even among ourselves. Formerly no person would engage in any important undertaking, or remove from one house to another, without previously putting salt in his pockets. The veriest mendicant in the streets was independent enough to scornfully refuse charity if it were not courteously prefaced by an offering of salt. In certain parishes of Scotland the farmers were accustomed to place salt in the first milk a cow had after calving when proffered to any body to drink, in order to prevent "skaith" (harm), should the individual happen not to be "canny." In Ireland it was customary for women and girls to sprinkle salt, mixed with flour, upon all persons when appointed to public offices; and before seed was sown in the ground the mistress of the household invariably scattered salt over it. The practice of laying a plate of salt on a dead body widely prevailed in the United Kingdom, and, indeed, is not yet extinct. This I have myself observed.

Two young ladies of my acquaintance, who certainly are not superstitious in other respects, once informed me on the morning of New Year's Day, that about a quarter to twelve the previous night they placed a portion of salt and bread crumbs upon the window sill, and then took a stroll up and down the square in which they reside. Upon their return, just at midnight, they at once removed the salt and bread into their chamber. Having inquired what motive they had for performing so silly an act, I was met with the pithy rejoinder, "Because it is *lucky!*"

The spilling of salt, or the over-turning of the salt-cellar has, from the earliest times, been regarded with the most superstitious dread, either as presaging some impending calamity to the unlucky individual himself, or as a sure sign of some fell casualty about to happen to the family :—

> "Salinum in mensa evertatur—omniosum est."

Such ill-luck is considered to be partially or wholly averted by throwing a little of the fallen salt over the shoulder into the fire:—

> "Mollivit aversus Penates,
> Farre pio, saliente mica."

Sometimes, however, wine poured on the lap was used as an incantation, and was regarded as infallible. Nathaniel Home enumerates, among bad omens, the falling of salt towards a person seated at table. He observes, "How common it is for people to account it a sign of ill-luck to have the salt-cellar to be overturned, the salt falling towards them."[*] And Bishop Hall, referring to the superstitious man, remarks, "If the salt fall towards him he looks pale and red, and is not quiet till one of the waiters have poured wine on his lappe."[†]

A rare old English ballad professes to explain the cause of this unlucky omen:—

> "We'll tell you the reason
> Why spilling the salt
> Is esteemed such a fault;
> Because it doth everything season.
>
> "Th' antiques did opine,
> 'Twas of friendship a sign,
> So serv'd it to guests in decorum,
> And thought love decay'd,
> When the negligent maid
> Let the salt-cellar tumble before them."

Of all nationalities possibly the Germans have the greatest abhorrence of spilling salt. This peculiarity might be regarded partially as a religious superstition. Leonardo da Vinci, in his grand masterpiece, "The Last Supper," represents Judas as having overturned the salt-cellar; perhaps, to signify, as has been plausibly suggested, the reluctance of Iscariot to share salt with one against whom violence was intended. It is somewhat remarkable to find old scholars and divines like Dr. Horne and Bishop Hall avowedly favouring such popular superstitions. Even at this day it is regarded by many persons, who ought to know better, as unlucky to help another to salt. Hence the apophthegm, "If you help me to salt; you help me to sorrow."

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[*] Dæmonology.

[†] Characters of Vertues and Vices.

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CHAPTER V.

BISCUITS.

THE preparation or manufacture of biscuits[*] is of considerable antiquity. We know that the Greeks were partial to a species of hard bread, into the composition of which entered the ingredients of farina, water, cheese, pepper, and saffron. As time advanced, and mechanical skill and appliances improved, the process of biscuit-making became more scientific and perfect. Ingenious machinery having taken the place of rough hand-labour, the compositions of which biscuits are made grew more plastic, and changed more completely from a *ruda indigestaque moles*, to a light, elastic, and assimilative compound.

Biscuits are divided into two principal classes, viz., the fermented and the unfermented. The unleavened, which are known as sea-biscuits or ship-bread, are made of wheaten flour, water, and common salt. In the preparation of other kinds of biscuits,—whose name is Legion,—a variety of materials is introduced, embracing butter, eggs, spices, sugar, caraway seeds, together with seasonings of divers kinds. The process of biscuit manufacture, especially where intricate and delicate machinery is employed, necessitates the utmost care in manipulation, so as to promote the proper incorporation of the several ingredients. Thus, for example, the butter is mixed with the flour in a dry condition, when water or milk is added, as the case may be. Again, when eggs are used, they are thoroughly beaten up with water, and then egg-paste is added to the dough, which had previously been prepared with butter. So great is the demand for biscuits, that from 30,000 to 50,000 lbs. weight of such commodities are furnished to the market every week. Singular to say, that while the steam engine and machinery have been introduced in almost every other art, that of biscuit making, until the year 1833, was performed by hand. The first machine for this purpose was the invention of Mr. Grant, an official connected with the Victualling Department at Portsmouth. It was originally erected at Weovil, under the direction of Sir John Rennie.

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[*] The name is derived from the French *bis cuit*, "twice baked," because that was the process originally adopted in their manufacture.

Reading has earned for itself a cosmopolitan reputation owing to the great biscuit manufactory of Messrs. Huntley & Palmer. In this extensive and remarkable establishment several thousand sacks of flour are weekly converted into biscuits and cakes of various kinds. Indeed, the very nomenclature itself is quite a study, each sort possessing peculiarities especially its own. Some are called after royal and other distinguished persons, such as Albert, Alberta, Victoria, Leopold, Napoleon, Oliver, Alexander, Abernethy, &c. Others, again, bear the name of familiar places, as Osborne, Shrewsbury, Tunbridge, Brighton, Bath, Dover, and even Presburg, Jamaica, and Savoy. Some are denominated American, African, German, and Oriental. Furthermore, the chief ingredients which form the several compositions used in the preparation of biscuits give them their titles. Accordingly, we have biscuits known as almond, arrow-root, bran, butter, charcoal, filbert, ginger, lemon, maizena, pearl, raspberry, soda, spice, vanilla, water, wafer, walnut, and wheaten. Nor is the category complete without mentioning tea, coffee, cocoa-nut, dessert, lunch, diet, nic-nac, pic-nic, soirée, and even tourists' and travellers' biscuits.

Messrs. Huntley & Palmer's establishment is at once the most unique, colossal, and noted of its kind in the world. It comprehends an imposing array of buildings, having towering chimneys here and there, which cluster on either bank of the river Kennet, a tributary of the "gentle Thames." The wonderful mechanism and surprising industry carried on in this extensive manufactory—which gives employment to nearly two thousand men and boys, and wherein fully one hundred and fifty different sorts of biscuits are turned out,—can more readily be imagined than described. In fact, they are beyond the power of perfect description, so intricate and complicated are the several processes. Possibly not one of the departments into which the manufactory is divided possesses so much interest for the uncommercial visitor as the Bride Cake Room, where those interesting artistic compositions may be seen in all stages of their formation, from the naked, round-looking cheese-like lumps, to those exquisitely elaborated, decorated, and completed forms, which grace the bridal breakfast-table of the aristocracy and the upper middle-classes.

Nor is the huge biscuit factory of Messrs. Drew & Sons, Shadwell, unworthy of being placed side by side with that of which I have given a slight description. Albeit the edifice is not pretentious, still it is massive and extensive, and replete with the most modern machinery for performing the difficult and diverse operations for which it was designed. Upwards of one hundred sorts of biscuits are regularly turned out from this active centre of industry, all of which have earned a reputation which creates a constant and increasing demand. Perhaps the most notable portion of the large building embraces the rooms in which are stored considerable quantities of English, Venetian, and Viennese flour, each sort being employed in special manufactures. No slight judgment is necessary in the selection of flour for specific purposes, as the kind that would suit light cakes would be very unfit for wine-biscuits.

Not very long since the *Morning Advertiser* devoted nearly two columns of its space to an elaborate description of Messrs. Drew & Sons' establishment. From that interesting and graphic account, I cannot do better than reproduce the following paragraph :—

"There are other processes carried on here which are involved in the production of many articles in great demand in this trade, all of them displaying a great deal of ingenuity of a high order, and which we might dwell on with the promise of some interest to our readers, if the space at our disposal were proportional to our materials for occupying it. Enough has been said, however, to indicate the great perfection which is everywhere aimed at in this manufacture; and we propose, therefore, to pass on to notice the remaining points of any interest or importance that presented themselves to our mind during our visit. The baking having been accomplished, the trays on which the goods have been baked are deposited on a 'Jacob's Ladder,' which carries them to the packing floor. The 'Jacob's Ladder' is an apparatus consisting of two endless chains, formed of long, straight links jointed together, and passing above and below round two octagonal frames, which are kept in almost continual motion. Each link carries a point of support for a shelf, which, as it comes up to the level of the table on which the trays taken out of the oven are placed, is immediately loaded with one. The succeeding ones go up similarly loaded, and the empty ones are made to bring down the trays when done with. The tins used for packing are made on the premises, and those returned are washed in strong pickle, relabelled, and repapered for the reception of fresh goods. When thus ready to be sent out, they are removed to the Forwarding Room, whence they are sent off to the agents of the Firm at Liverpool, Brighton, and Dartford for the supply of the country trade, or are despatched in the numerous vans of the Firm, which daily visit every portion of the metropolitan district. In connexion with this point it may be remarked that the premises include stabling for seventy horses, and that steam machinery enters largely into the equine economy of the establishment; the chaff is cut, the oats bruised, and the horses groomed by it. The Firm has a farm of three hundred acres in the vicinity of Romford, and any invalided horses are sent down to some excellent pasture there to recruit. A horizontal engine drives all the machinery on the premises, which, we should observe, comprises several sets of the various machines we have noticed, which are not nearly all, however, that are used here. A lift works through the entire height of the building, upwards of seventy feet. These extensive premises are supplied, also, with a variety of offices for subsidiary purposes, and, in fact, with every requisite for carrying on a large and still increasing trade. It may be mentioned that this well-known and deservedly-esteemed Firm was founded by the late Mr. William Drew, a gentleman most popular throughout the large trade in which his principal connexion lay, and whose lamented death by an accident about ten years ago deprived many of its members of a beloved friend, and its Charities of an always liberal benefactor. Since his death, the business has been much extended and improved by his son and successor, Mr. Lear J. Drew, who has from the first emulated the liberality of his late father."

The Biscuit Factory of Messrs. Gray, Dunn & Co., of Glasgow, is likewise an establishment of considerable extent and industrial importance. The business of the Firm was commenced close upon a quarter of a century since; but having grown beyond expectation, it was found necessary to erect larger premises in Kinning Park. This was in 1862. Last January, however, a destructive fire occurred, so that an entirely new factory had to be constructed which, as regards elegance and completeness, is justly regarded as one of the sights of the City. Some idea of its character may be formed from the fact that the premises cover close upon two acres of ground. The main structure consists of four storeys, while the lofts are of huge dimensions.

In an establishment where such increasing activity obtains, the machinery must necessarily correspond, no less than the *employés*, who number four hundred. The stock of flour must needs be prodigious, when one oven alone turns out some 28,000 ship biscuits *per diem*, and another about one and a quarter millions in the same time. Accordingly, we find that the working stock in constant requisition comprises from

2,000 to 3,000 sacks, each sack containing 280 lbs. In the preparation of the divers productions no less than twenty kinds of British and Foreign wheat are called into requisition. But although flour is the chief ingredient in each preparation, still a variety of other matters are employed, such as eggs, sugar (loaf, crystal, and soft), milk, butter, fruit, citron peel, syrup, almonds, spices, including ginger, nutmeg, cinnamon, &c. As the qualities of the biscuits vary, so do the other materials both in quality and kind. Not only so, but the different sorts require varying periods of time in order to complete the baking process. And in order to facilitate this arrangement each oven possesses an ingenious mechanism for regulating the speed at which the biscuits shall travel through the baking chamber. Some light articles need but a few minutes to perfect, while others, such as ship biscuits, require nearly half an hour.

The Kinning Park Biscuit Factory is noted for the variety and excellent quality of its commodities. These comprise, amongst others, ordinary biscuits, plum cakes, lunch cakes, rice cake, currant cake, sultana cake, queen cake, seed cake, citron cake, pound cakes, Madeira, Swiss, Berlin, Florence, and Edinburgh cakes. Then there are bon-bons, and ginger-nuts, which are made at the rate of three tons weekly. Indeed, such is the demand for certain kinds of "combinations," that from five to eight tons per week are found necessary. Nor must I omit "Queen's drops" —so largely consumed on this side of the Tweed— which are manufactured at the extraordinary rate of from one to two tons every week.

According to the *Glasgow News*, " One of the most surprising facts in connection with Messrs. Gray, Dunn & Co.'s ordinary work in biscuit manufacturing is in respect of the 'A.B.C.' biscuits. These have the letters of the alphabet impressed upon them round the outside, and hence the name. The retail price is one farthing! Since the School Boards became established over the country, these biscuits have been turned out at the rate of six tons per week on an average."

Immense quantities of Messrs. Gray, Dunn & Co.'s goods go to Holland and Norway, while they are in regular demand in France, Germany, Sweden, North and South America, and even the East and West Indies, with other foreign countries and British dependencies. There is a peculiarity about certain descriptions of biscuits which possesses some interest. For instance, those known as "Lancashire Peas," are chiefly consumed in the North of England, while the "Queen's drops," and the "Highland cakes" find a ready-market in various parts of the country.

The Original "Oliver Biscuit" Factory of Mr. James Fortt, of Bath, is well deserving of notice ere I conclude this subject. With the name of the ancient and highly fashionable city of Bath the well-known "Oliver Biscuit" is intimately associated. The Original "Oliver Biscuit" is a *spécialité*, requiring the utmost care in its production. Unlike biscuits generally this is fermented, which circumstance calls for the exercise of a nice judgment, and expert manipulation in its manufacture.

If not placed in the oven just when ready, the biscuits, to use a trade term, would become "over-proved," that is, would grow too spongy, and consequently be spoiled. On the other hand, should the biscuits not be suffered to ferment sufficiently they would lose the choice delicacy and beautiful crispness which characterize them, and be equally unsuited for the public. It is further necessary that the "Oliver Biscuits" should be hand-made, inasmuch as they could not be cut and rolled successfully by the application of machinery, as is the case with unfermented biscuits.

The annexed particulars respecting Mr. James Fortt's *spécialité*, is extracted from an interesting article on the "Food Products of Bath," which appeared in the *Food Journal* for February, 1873. The writer remarks :—"One thing peculiar to Bath, and which can be made in no other place, is the "Oliver Biscuit." Dr. Oliver, a physician of great repute in the days of Beau Nash, invented these biscuits in 1735 for the benefit of his patients. An interesting painting, containing the portrait of this clever and energetic man, is to be seen at the Bath Mineral Water Hospital, to which establishment he was the first physician appointed. He gave the biscuit recipe to his coachman, adding to it a present of five sacks of flour. With this the man set up in business as a baker. The name of Dr. Oliver's favoured coachman is not known, but the biscuits have since obtained such a reputation as warrants the conclusion that he carried on a flourishing business, and that he needed no further help than the five sacks of flour with which the kindness of his master had originally provided him. Since then the recipe has remained a secret, carefully preserved, and handed down with the business. So precious is it considered that the present proprietor, Mr. James Fortt, paid a considerable sum for the goodwill of the same. The manufactory is in Green Street, and has been carried on for many years, though it has passed through different hands. The biscuits are particularly nice, but so simple that they seem as if they were made only with flour, butter, and water; but that there is some secret connected with the making has been proved by the attempts to produce them made by the uninitiated, that have only resulted in unworthy imitations of the real article. The "Oliver" is peculiarly crisp, and is good either with wine, dessert or cheese. It is stated to be the only biscuit that is fermented, and on that account is good for invalids suffering from acidity on the stomach, for which yeast is a corrective. It is difficult to find a more welcome present of the kind for a person at a distance, than a tin of genuine "Oliver Biscuits," and I have been flattered by finding them an acceptable offering in an aristocratic household."

Having tested the original "Oliver Biscuits," I can unhesitatingly pronounce in their favour.

I should have felt gratified in noticing the new London establishment of Messrs. Peek, Frean & Co., but I refrain in deference to those gentlemen who object to publicity being given to their processes, which, for special reasons, they strenuously guard from outside observation.

CHAPTER VI.

MILK.

THE importance of cows' milk as an article of domestic consumption cannot well be overestimated. Its chemical properties render it particularly wholesome and nutritious, as they combine the elements of animal and vegetable food. These elements consist of a large proportion of caseine, or cheesy matter, and various parts of butter, sugar, salts, and water. The caseine and butter represent the fibrine and fat of animal food; the sugar represents the starch of wheaten bread; the salts develop the osseous system; the curd contributes to the formation of the albumen and fibrine of the blood; while the combined saccharine and unctuous substances—to the latter of which the colour and opacity of milk are attributable—produce carbon and hydrogen. These gases supply combustive ingredients for the lungs, and aid in creating and maintaining animal heat. Milk is admitted to contain all the materials essential to the sustenance and growth of the human body. Hence it is generally given to infants and children, while many of the former subsist entirely thereupon. At the same time there is scarcely a household in which it does not form a portion of the daily food. But milk is not simply estimated for its nutritive qualities alone; its restorative effects some physiologists regard as considerable. Throughout Germany and Switzerland there are numerous establishments for the cure of chronic disorders by the use of aromatized whey. These hospitals or asylums are designated by the titles "Molkencuren" and "Cures de Petit-Lait." *

Pure cows' milk possesses a beautiful opaque white colour, and has an agreeable, emulsive taste. When left to spontaneous decomposition, at a proper temperature, it passes through three stages, namely, the vinous, acetous, and putrefactive fermentation. The first of these continues but for a short time, the proportion of ardent spirit eliminated being small.

Milk is not alone valuable in itself, but forms an indispensable article of daily food;† and as thousands of infant lives literally depend upon it, should therefore be obtained pure and unadulterated. But possibly there is no commodity supplied to our tables more difficult to obtain genuine, so that what should prove delectable becomes more or less detrimental.

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* Treatise on Food and Diet, by John Pereira, M.D.

† Milk, considered as an aliment, is of such importance in domestic economy as to render all the improvements in its production extremely valuable. It was always a favourite food in Britain. "*Lacte et carne vivunt*" says Cæsar in his *Commentaries*; (The inhabitants subsist upon flesh and milk.)—*Webster's Encyclopædia of Domestic Economy*.

Milk is peculiarly liable to adulteration, to effect which water is chiefly employed, and in proportions varying from ten to fifty per cent. Hence the sky-blue colour, flimsy appearance, and insipid flavour, which characterizes milk when deprived of its nutritious constituents. Milk is further deteriorated by the admixture of skimmed-milk, or that from which the cream has been abstracted. Sometimes, in order to produce a good yield of this oleagenous fluid, zinc pans are employed. A more objectionable practice could scarcely be adopted, as the carbonate and oxide of the metal, owing to their peculiar decomposing qualities, are almost certain to become incorporated with the milk, rendering it not simply unwholesome but positively dangerous to health. The condition in which cows are in materially affect the character of their milk. Accordingly immense care is necessary in those who have charge of dairies. The milk of diseased animals is obviously unfit for domestic use; as, according to the united testimony of Labillardière* and Duprey (who formed their conclusions from chemical tests), the peculiar disorders of the cattle become communicated thereto. The distemper termed *Cocote*, so prevalent among cows in Paris several years since, was known to have affected morbid changes in the milk they yielded. This circumstance excited considerable attention at the time in scientific circles.

The chemical character of milk is materially affected by the condition in which metropolitan cow-sheds are kept. When these are narrow and ill-ventilated, the absence of oxygenized, or vital air, combined with ammoniacal vapours, induces diseases in the animals subjected to such noxious influences. The quality of London milk is further deteriorated by the improper manner in which cows are sometimes fed. Very rarely are they turned out to grass, but are dieted too frequently after an artificial and unnatural system. When the principal constituents of their food consist of brewers' grains and distillers' wash, the milk-producing organs are over-stimulated, so that large quantities of the unctuous liquid becomes secreted. Consequently the milk is both inferior in quality and deficient in nutritive properties. Besides, such vile compounds are highly injurious to the beasts, making them "grow sick," as it is termed, and producing distressing diseases, which wear them out and carry them off rapidly. Notwithstanding its injurious nature, distillers' wash is much relished by cows. Having partaken of it a few times, so depraved becomes their appetite that it is difficult to make them receive any other food. One remarkable effect of this washy diet is that it bloats and puffs up the animals, giving them the appearance of abnormal fatness.*

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* Dict, Med.

The mal-odorous and unhealthy atmosphere of certain cow lairs, when it does not arise from the offensive sour-smelling slop upon which the animals are fed, is traceable to narrow space and the carbon expired during the process of breathing. A shrewd, scientific writer, treating of this subject, observes: "Upwards of 6 lbs. of carbon are expended by a cow daily in the production of animal heat; and as one pound of carbon, when combined with the necessary amount of oxygen to form carbonic acid, gives out as much heat as would melt 104·2 lbs. of ice, the quantity of ice capable of being melted by a cow in a day would amount to upwards of 625 lbs. It would consume also the enormous quantity of 330,429 cubic inches of oxygen gas, or 191¼ cubic feet, and as this amounts to one-fifth of the atmospheric air, one cow consuming 6 lbs. of carbon for respiratory purposes, would require 956¼ cubic feet of atmospheric air."* Cleanliness, proper diet, and pure air, therefore, are not only of paramount importance in preserving the health of cows, but are absolutely essential to the purity and wholesomeness of their milk. As I have said, the food supplied to cows potently influences the character of the milk they yield. That obtained from pastures is certainly the most proper and natural; but when such is not available, dried grass or hay, with carrots and beet-root, should be given. The former materially reduces the quantities of caseine and butter, largely increasing the sugar, while the latter produces a similar result, but to a more limited extent.

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* *Vide* Harleian Dairy System.

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* Experimental Researches on the Food of Animals, by R. D. Thompson, M.D.

The following exhibit tabulated illustrations of the chemical constituents of cows' milk in a normal and a more or less deteriorated condition:—

Normal State of Milk.

Caseine (cheesey matter)	4·48
Butter	3·13
Sugar of milk	4·77
Salts (various)	0·60
Water	87·02
	100·00

Milk of Cows Fed on Beet-root.

Caseine	3·75
Butter	2·75
Sugar of Milk	5·95
Salts	0·68
Water	86·87
	100·00

Milk of Cows Fed on Carrots.

Caseine	4·20
Butter	3·08
Sugar of milk	5·30
Salts	0·75
Water	86·67
	100·00

On the testimony of Dr. Hardwick, "The occasional examination of milk by Metropolitan Medical Officers of Health has undoubtedly been the means of improving the quality of London milk. Dairy companies and dairies have professed to supply the public with a better quality of milk by bringing it from the country by rail. A keen competition of London cowkeepers has also brought about a better mode of cow feeding. The health of cows is more attended to, so that the quality of London milk may now be favourably compared with that brought from the country to London by railway."

Unprincipled cowkeepers have recourse to certain "sharp" practices so as to keep up their usual supply of milk, and make their cattle "pay" at the public sacrifice. These consist, firstly, in continuing to milk cows while in an advanced state of gestation, and, secondly, in suffering them to become in calf within two or three months after having calved.* In each case their milk is deteriorated and deficient in nutritive qualities, while the physical injuries sustained by the animals and their young are proportionately great. The first milk of a cow after calving is yellow, thick, and stringy. It is called "colostrium," but by milkmen, "beastings." This state of the milk lasts from three weeks to a month, but is very bad for the first ten days, during which time the milk is not fit for use. From the end of the first to the termination of the third or fourth month the milk is in prime condition. Further, the specific gravity, chemical qualities, and the quantity of milk, are influenced in a marked manner by the age of cows, frequency of milking, and even the weather. Thus, in hot countries and dry seasons the yield is less, but the quality is better. Cold favours the productions of sugar and cheese, while warm weather augments the amount of butter.

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* The cow carries her calf for forty weeks, or ten lunar months. It is a common practice to milk the cow for the first seven, eight, or nine months of this period, a custom which albeit objectionable, is still necessary, as otherwise the animal could not be profitably kept.

The quantity of milk consumed in the Metropolis is something prodigious; amounting to nearly two hundred million quarts annually. This immense supply is supposed to be yielded by twenty-five thousand cows, which give a daily average of nine quarts each. The yearly sum paid by the London public for this luxury amounts to not far off two millions sterling. In the United Kingdom, about one thousand one hundred and twenty million quarts are consumed every year, the number of milch cows supplying this immense quantity being estimated at nearly one hundred and fifty thousand. Over three million gallons of milk are yearly supplied by farmers to dealers of the Metropolis. A very large proportion of this milk travels on the Great Western, the Midland, the London and North Western and the Eastern Counties Railways, for which the Companies charge ¾d. to 2d. per imperial gallon, according to distance.

At the close of last August a general meeting of the cowkeepers and grain contractors of the metropolis was held in order to consider what steps should be taken to reduce the high price of grains as charged by the brewers and distillers. A resolution was then adopted to the effect that a petition should be drawn up, urging that in consideration of the heavy crop of hay in the market, with thousands of tons fitted for the ensuing season, and as owing to the rinderpest but comparatively few cows could be kept in London, the brewers and distillers should consent to a reduction of their charges. At a subsequent meeting held a day or two afterwards, it was resolved to prepare and forward a memorial on the subject.

In Munich, milk is not suffered to be hawked about, and is only allowed to be sold at shops and in public markets. Then the article must be wholesome, clean, and unadulterated, and kept by dealers in wooden earthenware, or tinned-iron vessels. It is further subjected to official inspection, together with the places in which it is retailed. No dealer can commence business without having first given notice of his intention, when his name is entered under a special number in the Municipal Register. Adulteration of this commodity is punishable by confiscation of the milk so tampered with, by heavy fines, and, under aggravated circumstances, by imprisonment for two years.

The Express Country Milk Company of Museum Street, Bloomsbury, was established some fifteen years since for the purpose of introducing the use of country milk—brought from the best grazing districts in England—to London consumers. Previously the method of preparing milk for carriage by rail was so little understood that the supply for London was drawn from cowsheds in town and from the nearest suburbs, albeit even the short distances the milk had then to be brought in warm weather, often caused it to turn sour before it could be delivered. The milk received by the Express Company is specially prepared for the long journey by a patent cooling apparatus, one of which is in use at every farm. A few years back important evidence was given by Mr. George Barham, the Managing Director of the Company, before the Society of Arts, upon this and other questions affecting the London milk supply. So great is the demand for country milk, that the majority of the best dairies in London obtain the whole, or nearly the whole of their supplies, from the Express Company, whose annual sale reaches the enormous total of between six and seven million quarts. This result has been obtained without advertisement of any kind, the Company having relied solely on the recommendations of its customers; a careful attention to whom has placed it in its present proud position as the largest dairying Corporation in the world.

The supplies for this huge business are drawn from over one hundred carefully selected farms, some of them the best in England. Amongst them rank Blenheim Park, the Oxfordshire estate of the Duke of Marlborough; Sherburn Park, the property of the Earl of Macclesfield; Knebworth Park, the seat of the late Lord Lytton; Lullington Park, the residence of Colonel Colvile; and Ellistown Farm, the Leicestershire estate of Colonel Ellis. The Company also possess some 150 acres of capital meadow land at College Farm, Finchley. The cattle there—fine specimens of both the Shorthorn and Alderney breeds—are carefully tended and fed, so as to yield the most suitable milk for young children and invalids. This milk is sent out in sealed cans, and, owing to the shortness of the distance, is delivered in less than an hour after milking.

No precautions are neglected by the Company to ensure the perfect purity of the milk and the complete cleanliness of the vessels in which it is delivered. Any doubts on the former point are at once set at rest by reference to Professor Redwood, the cost of whose analysis the Company are always willing to bear. The lately introduced system of cleaning the milk churns and cans by steam is extensively used by this Company, the same power being utilized to drive an engine for cutting chaff, bruising oats, &c., for the horses, to work the steam pump connected with the artesian well, and for a variety of other purposes.

The staff are all picked men, who are well paid, and a stringent code of regulations is observed as to their sobriety, punctuality, civility, &c.; the use of tobacco or snuff whilst on duty being also strictly forbidden. Further, the Company pay careful attention to the health of their *employés*, and retain the services of a medical gentleman for that purpose.

After what I have said, it will be seen that nothing is left undone to secure the best possible milk supply, and deliver it in the most perfect condition to customers. In addition to its extensive family trade, and the supply to a great number of dairies, the Express Company also serve many of the largest institutions in the metropolis and suburbs, including the Hospital for Consumption at Brompton, St. Bartholomew's Hospital, Guy's Hospital, Westminster Hospital, each of the central London Sick Asylums, the whole of the Middlesex Prisons, &c. I am glad to find that many medical gentlemen, Officers of Health, and others, have testified in the highest terms to the richness and purity of this Company's milk; and Dr. Letheby's and Professor Wanklyn's analyses, made by order of the Local Government Board, have had an equally satisfactory result.

The Aylesbury Dairy Company, whose chief office is situated at St. Petersburgh Place, Bayswater, have also done the metropolitan public good service, by insuring to it a pure and wholesome milk. The business effected is likewise immense, as large a quantity as 3,000 gallons of milk passing some days through the principal dairy. Albeit the standard of 10 per cent. of solids is that fixed by the Select Committee of the House of Commons, yet this Company maintain a standard of 12 per cent. Not only is every churn of milk sampled, tested, and the results recorded by officers appointed for that special duty, but a considerable number of complete analyses are hebdomadally made by an eminent chemist. Then, in order to guard against the possibility of malpractices, a staff of inspectors are retained, who, in their peregrinations, come in constant contact with the carriers, and take samples of the milk while being delivered.

The Company's daily supply of milk is received from sixty different farms, over which the most minute supervision is exercised. A general medical inspector is engaged to overlook those farms, and see that they are kept in the best sanitary condition possible. Reports upon the farms, and the care taken in the carrying out of the Company's regulations, are periodically given, while an inspecting engineer of acknowledged ability looks after the water supply, the drainage, and divers details of dairy hygiene. The establishment at Bayswater covers close upon an acre of ground, while every portion of the building in which milk, cream, or butter is stored, is constructed of impervious materials. Contiguous to the business premises are a series of dwellings in which the workpeople reside. These are also built with due regard to sanitary arrangements. The Aylesbury Dairy Company likewise supply all other descriptions of dairy-farm produce, including butter, cheese, bacon, hams, lard, eggs, &c., having a large cheese factory and pig-feeding establishment in Wiltshire. The services of a local medical practitioner are retained for attending to the health of the *employés* who number over one hundred.

The Suburban Farm Dairies of Messrs. Welford & Son, of Warwick Place, Maida Hill, Queen's Road, Bayswater, and other places, are likewise deserving of well-earned commendation. Dr. Hardwick, the Medical Officer of Health, testifies that he invariably found in the samples examined a high standard of milk, namely, more than 12 per cent. of cream, being in excess of the Standard furnished by the Select Committee of the House of Commons. This fact is corroborated by the *Medical Times*, which in its analyses of a variety of specimens procured by a trustworthy person from milk sellers in the West-end of London, gives the place of honour to Messrs.

Welford, whose milk was found to contain 18 per cent. of cream, while that obtained of other dealers had but 13, 12, 8, and 6 per cent. respectively. Mr. James C. Broad, Veterinary Surgeon, and a Government Inspector, likewise avers that he had never seen a finer or more excellent dairy of cows than those kept at the Warwick Dairy Farm; that their health and general condition were all that could be desired; that their shed was roomy, well-ventilated, kept particularly clean and in good order; and, finally, that a dairy of cows more uniform in quality and general appearance he had never before witnessed.

The milk supplied by Messrs. Welford & Son is principally obtained from their own cows, and, when the supply is not equal to the demand, from first-class farms in the county of Bucks. These farms are not only regularly inspected, but the milk is invariably analysed before leaving the respective dairies. By such minute precautions a supply of milk of undoubted quality is assured. A *spécialité* of the Firm's business is the supply of rich milk for infants. With this view select cows are kept and fed separately. The milk they yield is dispatched in sealed cans direct to families, by special delivery, as late as 8 p.m. during the summer months.

The importance of being able to procure good, rich new milk cannot be over-estimated in the case of mothers under certain circumstances; but, as the *Medical Times*, in its report on the milk supply of London, pertinently remarks:—"Neither rich nor poor, and, we may add, not even their medical attendants, are, in all cases, sufficiently careful to secure the best available milk. 'How do you feed your baby?' asks the doctor of a mother whose child is seriously ill with diarrhœa. 'Oh, sir, with milk, with so much water and sugar.' Suppose the doctor asks, 'What milk?' the answer probably is, 'Oh, what is brought round by the regular milkman;' in fact, a weaning child may be fed till it dies on milk which may be a little stale or indigestible, or which may have its finer nutritive qualities impaired, and every variety of farinaceous and other food may be tried in vain, whilst a perfectly pure milk, fresh from the cow, might have settled all the difficulty at once."

Messrs. Welford & Son's business is both extensive and extending, as may be imagined from the following particulars. Steam appliances are employed for cleansing the various utensils in use. These number, in churns, pails, &c., over three thousand, all of which have to be thoroughly cleansed daily. Over fifty workpeople are engaged, consisting of men and women; while a dozen horses and ponies are brought into requisition in order to supply a constituency, which extends over the West and North-west districts. Owing to the circumstance of the Messrs. Welford having taken the prize at a recent Dairy Show, their trade has not simply been improved, but they were honoured by being appointed purveyors to the Queen.

Various instruments are employed for the purpose of determining the specific gravity, chemical constituents, and purity of milk and cream, such as the hydrometer, the lactometer, the lactoscope, the centesimal galactometer, and other inventions of more recent times. These are all very simple and ingenious, while either might be used with decided advantage for the purpose of testing the goodness and wholesomeness of so general and indispensable an article of our daily food as milk constitutes.

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CHAPTER VII.

FOOD FOR INFANTS AND INVALIDS.

THE great mortality that occurs among children of tender years, even amongst the upper and middle classes of society, is mainly due to improper treatment. The young, after they quit their mothers' or their nurses' arms, are frequently handed over to the care of persons who are utterly unqualified for their responsible positions. They know nothing whatever of the chemical properties of food, or of the functions of the human stomach, and are equally ignorant of the processes of nutrition. Is it, then, to be wondered at if the health, and possibly the lives, of those entrusted to their care, should be imperilled in consequence? The only surprise is that many more children are not yearly sacrificed to the Moloch of Ignorance.

The mode of dieting infants and children is of paramount importance; for, as Dr. Herbert Barker* testifies, " a slight disorder of the digestive organs in infancy, induced by over much or improper food, entails a weakness of those organs through life." This view is corroborated by Dr. Coley,* who affirms that "infants thus afflicted seldom in after life possess strong digestive powers, and frequently, when females, are the subjects of neuralgic and hysterical diseases." It is a melancholy reflection, truly, that about one-fourth of the children born in England die before they reach their fifth birth-day. Such

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* On the Hygienic Management of Infants and Children.

"An unripe harvest for the scythe of Death"

may readily be prevented by proper attention, and especially by judicious diet and regimen. Hence Milton's language applies particularly to mothers of families, and such as are entrusted with the nurture of the young:

"Not to know at large of things remote
From use, obscure and subtle, but to know
That which before us lies in daily life,
Is the prime wisdom."

Some children are literally fed to death, while others perish through sheer deficiency of proper food. Overfeeding, on the testimony of Dr. Durwall,† is "one of the most fruitful sources of infantine diseases." No doubt it was the consciousness of this fact that induced the Obstetrical Society of London, in a *brochure* on "Infants' Diet," to lay down a series of rules for the general management of the young. The writer emphatically states that "meat, potatoes, and food, such as grown-up people eat, are often given to young infants; which kind of food, and all stimulants, are entirely unsuitable, and are common causes of diarrhœa and other troubles." It is decidedly painful to be informed from the same authoritative quarter, that "most of the mortality from hand-feeding arises from the use of arrowroot, corn-flour, and other unsuitable kinds of food, which consist of starch alone, and contain no proper nourishment." Similar testimony is given by Dr. Barker, who directs mothers and nurses "never to depend on such articles as sago, arrowroot, or tapioca as main ingredients of infantine diet," as these articles are deficient in nutritive qualities. It cannot be gainsaid that a considerable portion of the mortality of infants reared by hand is the clear result of dietetic errors, either as regards the quality or the quantity of the artificial food administered to them. Speaking of the relation of food to the mechanical powers of the system, Mr. Charles Beckett* observes:—"The difficulty of getting parents to attend to simplicity of diet in children under five years of age, is a fertile source of disappointment to the practitioner, as well as of atrophy, marasmus, and infantile remittent fever (all fatal forms of disease) to the child. This foolish system of indulgence extends to the lowest ranks of society, and seems often to be the most practised where it is likely to be the most injurious." Moreover, Dr. Carpenter, in treating of a totally different topic,† goes out of his way, as it were, to touch upon the indifference of some mothers to the well-being of their progeny. "It is surprising," remarks this eminent medical writer, "to see some mothers, who are fond of their children, even to distraction, using their utmost endeavours to murder them with a kind of food that, as everybody must be sensible, is death to them. Who in the world, endued with the faculty of reason, can imagine that such a tough substance as flesh can agree with infants before Nature has provided them with teeth to chew it? Or, who in their senses, would cram a child with food that a vigorous adult has enough to do to digest?"

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* Diseases of Children.

† Management of Infants.

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* A few Practical Observations on Diet, especially that of Children and Invalids.

† On the Use and Abuse of Alcoholic Liquors in Health and Disease.

Dr. Dewees,* an eminent Transatlantic authority, refers the excess of mortality among children to the mal-administration of the means of life rather than to the operation of natural or inevitable causes. "Some," he observes, "are nursed to death, while many die because they are not nursed at all; some are fed to death, while others die from inanition; some are physicked to death, while others die from the want of a single dose. All these cases," he continues, "combine to prove how much experience and judgment are required to administer with success to the many little wants and infirmities of children."

Slippery, indeed, is the health of those innocent little creatures, whose chief dangers are engendered by a fatuous over-kindness, barren of common sense and discretion. The general principles upon which Dr.

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* Treatise on the Physical and Medical Treatment of Children.

Barker insists cannot be too well understood or too scrupulously followed by those who have the charge of infants and children. These are, first, that a sufficiency of thin and light food should be administered, but not in excessive quantity; and, secondly, that a selection should be made, after due practical trial, of that particular preparation which suits best the stomach of the child. It needs, however, to be borne in mind that rice foods are inferior to *wheaten flour* in the flesh-forming principle, called "nitrogen" by chemists; and that all kinds of starchy foods are innutritious, and can never be depended on in the advanced stage of infancy. Upon these points Dr. Barker lays significant stress. While the first deviation from a purely liquid diet may commence in the seventh month, varieties of aliment may be needed during the second stage of infancy. Lightness, wholesomeness, and digestibility should invariably be studied. "It is only," remarks an eminent authority, "when the coming teeth are on their road to the front that the parotid glands secrete sufficient saliva to digest farinaceous food. When dribbling begins, then is the time to commence with the preparations of those substances bountifully supplied by Nature and art."*

Invalids, as a rule, require a regimen equally as light and nutritious as children of tender years; always bearing in mind that it is not the quantity of food eaten, but the quantity which is perfectly digested, that nourishes the system. In delicate persons the

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* Regimen of Infancy.

solvent, *converting*, *completing*, and *vitalizing powers* of the stomach are more or less deficient. Hence the urgent necessity for caution in the selection of articles of diet. Dr. Thomas King Chambers, treating of weak digestion and the decline of life,* remarks: "As the movements of nutrition are retarded, and the constructive and evacuating actions of the system diminished, it becomes a moral duty to avoid all articles of diet which personal experience has shown to be difficult of solution, and to make smaller, and, if need be, more frequent meals, so that the stomach may not get overloaded or be too long idle."

Whatever food we partake of resolves itself into two classes, namely, the elements of Nutrition and the elements of Respiration. The one goes to nourish the structure; the other creates animal heat by the process of breathing. The former, as Mr. C. Beckett shows, are quadruple compounds of four gases, nitrogen being the principal; while the latter are triple compounds, composed of three gases, of which the chief constituent is carbon. "One great principle," to reproduce the language of the eminent authority noticed, "is, that under all circumstances those elements required by the system must be supplied by the food, in order to the continuance of health; for though the system has an *appropriation*, it has *no creative power*."

There are a variety of artificial foods for infants, children, and invalids, so that to select the best requires more than ordinary discretion. The chief defect of cows' milk as a regimen for the young and the invalid consists in its comparative deficiency of the creamy and excess of curdy particles.* So that this description of food would not do alone. Already I have shown how rice, arrowroot, sago, tapioca, and fine corn-flour lack the elements of proper nutrition. Accordingly, those preparations are to be distrusted in which any of the aforesaid commodities form the basis of the food.

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* A Manual of Diet in Health and Disease.

I know of no article more suitable for infants, children, and invalids, than the excellent preparation so widely and favourably known as Chapman & Co.'s "Entire Wheat Flour." With such scientific and mechanical skill is the bran prepared that the valuable phosphates and cerealin are separated from the flakes without undergoing the minutest injury or diminution. Dr. Tilbury Fox, of University College Hospital, in a "Paper" † read before a learned Society, of which he is a distinguished member, states, that at one time he entertained grave doubts as to the practicability of the process now so successfully adopted, observing: "When I became acquainted with the 'Entire Wheat Flour' I doubted whether the phosphates, and especially the cerealin (the fermentative principle and a solvent of amylaceous matter), might not be changed in the preparation. A careful analysis by Professor Attfield, however, fully satisfied me on this point, and I am now convinced of the value of the Flour, in which the bran is so finely ground, that, while it adds, from its peculiar nature, a certain degree of bulk to the intestinal contents, and so aids in keeping the system regular, it does not irritate or, as some persons say, 'heat' those who take it." Again, Dr. Fox observes, that his object in directing attention to this valuable Food, was to further the complete substitution thereof for the merely starchy compounds which are so generally used in households. "We systematically throw away," he remarks, "as mere waste those most valuable products which reside in the outer part of the wheat grain, and which are of such importance in the nutrition of bone and nerve especially." He further shows how the ordinary objections to whole grain flour on the ground of its being heavy, irritating, and indigestable, fails to apply to Messrs. Chapman & Co.'s *spécialité*, inasmuch as the delicate manipulation and the careful application of heat which it undergoes, absolutely remove the slightest danger of any ill-results following upon its administration.

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* Comparatively slight causes exert a marked influence upon the milk of the cow. If the animal be shut up and stall-fed, its milk almost invariably acquires a strongly acid property, which of itself is sufficient to account for the symptoms of gastric and intestinal disorder so often produced by it in the case of children brought up in large towns.—T. Herbert Barker, M.D.

† A Note on "Entire Wheat Flour."

I have before me the testimonies of a number of leading medical practitioners and professional chemical analysts, all of which pronounce strongly in favour of the "Entire Wheat Flour." The *Lancet* asserts that it is "altogether the most desirable for general consumption," and expresses a hope that "it will take the place of the purely starchy compounds now in use in the case of children and adults." Professor Attfield asserts that "its richness in gluten (or flesh-forming material), and earthy phosphates (or bone and teeth forming substance), shows it to be a very valuable food, especially for children, and incomparably superior to arrowroot, corn-flour, and other forms of starch, which contribute but little to the formation of bone and muscle." Dr. J. Langdon Down, after an extended trial, is convinced "of its extreme dietetic value for invalids, children, and many of the wasting diseases to which the latter are liable." Mr. G. Parkinson, of Charing Cross Hospital, believes it "quite necessary to the proper nourishment of children and adults." Dr. Horace Dobell, regrets that a medical treatise of his had been published when the "Entire Wheat Flour" was brought under his observation, observing that he "shall continue to prescribe it as long as it maintains the character which it professes to possess." Dr. Row, of the Royal Hospital, Devonport, remarks, "I shall be glad to hear that the whole tribe of corn-flours are entirely supplemented by the 'Entire Wheat Flour.'" Dr. Hinckes Bird pronounces it to "contain all the constituents of the grain, with the phosphates and other inorganic salts so necessary to the growth of teeth and brain, and to the nourishment of the system generally." Similar testimonies are willingly accorded by other persons of eminence in the medical profession, whose opinions are worthy of the utmost weight in physiological and dietetic matters. The discovery of a food preparation for infants and invalids which, while it affords the largest per-centage of flesh forming nutriment, exacts the least expenditure of vital force, is, assuredly, no ordinary *desideratum*, which the public should learn to estimate at its proper worth. The importance of such a Food to invalids, and children particularly, cannot be over-estimated, for, as Dr. Herbert Barker* testifies: "Infant life may be truly represented as so delicate and impressible that from our acts in accordance with, or in opposition to its nature, we may stamp upon it health or disease, physical happiness or misery, that shall endure as long as life itself."

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* On the Hygienic Management of Infants and Children.

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CHAPTER VIII.

PIES.

THE derivation of the word "pie" is supposed by some to come from "biezan," to build; that is, to build of paste. Junius considers it is derived, by contraction, from *pasty*, though others suggest that it is only a corruption of the French *pâte*. Dr. Johnson gives its signification as "a crust baked with something in it." At all events none can dispute that the pie constitutes a thoroughly English dish. Its exact origin may not readily be arrived at; still reference is made thereto by several early writers, so that at least it possesses a strong claim to antiquity. Chaucer, in his "Prologue to the Canterbury Tales," remarks of one that—

> "He coude roste, and sethe, and broil, and frie;
> Maken mortrewes, and wel bake a pie."

Again, Shakespeare, in "Henry VIII." (folio edition), causes *Buckingham* to give vent to his temper thus:

> "The devill speed him: no man's pye is freed
> From his ambitious finger."

Lord Bacon likewise remarks: "Mincing of meat in pies saveth the grinding of the teeth, and more nourishing to them that have weak teeth." Dryden, also, observes of some literary person, "He is the very Withers of the city; they have bought more editions of his works than would serve to lay under all their pies at a Lord Mayor's Christmas." Furthermore, King, in his "Art of Cookery," gives the following instructions:

> "Chuse your materials right;
> From thence of course the figure will arise,
> And eloquence adorn the surface of your pies."

And again, the same writer on Gastronomy adds, piquantly as it were:

> "Eat beef or pie-crust, if you'd serious be."

It seems that at one period a popular form of oath consisted in the phrase, "By cock and pie!" This adjuration is employed in the Elizabethan drama, and by the great dramatist himself. It is the sort of oath put into the mouths of such characters as *Justice Shallow* and *Master Slender;* as for example:

"'Mr. Slender, come, we stay for you.'—'I'll ate nothing, I thank you, sir.' 'By cock and pie, you shall not chose sir: come, come.'"

Then Walpole, in his "Anecdotes of Painting," alleges that "soon after the marriage of Charles II., the king and queen being entertained at Burleigh, little Jeffery was served up to table in a cold pye."

The town of Melton Mowbray, in Leicester, during half a century, has been noted for the excellent character of its raised pies. Possibly the preparation of this particular food had its origin in the circumstance that the place is frequented by many of the nobility and gentry during the celebrated hunting season, which commences the first week in November, and closes with the Croxton Park races, about the close of March. The Firm of Messrs. Colin & Co., have earned an extended and well-deserved reputation for the high character of the Pork, Veal, Ham, and Game pies which bear their name. The latter sort are composed of pheasants, partridges, and hares, the bones of the birds and animals being invariably removed.

The greatest care is taken in the preparation of the Melton Mowbray pies, so as to ensure their perfect richness and purity. It is the constant aim of the Firm to use no ingredient in the manufacture of their *spécialités* but what is of the first quality. What adds to the delicious flavour of the pork pies especially, and renders them so much liked, is the jelly with which they are enriched. This is made by boiling the feet, hocks, and bones from the parts used in the preparation of the appetizing and sustaining edibles.

Messrs. Colin & Co.'s commodities are largely consumed throughout the three Kingdoms. Considerable quantities are despatched every morning from the factory at Burton End by passenger trains to all parts of Great Britain and the Sister Country. Except in special cases the Melton pies are not exported. The London customers of the Firm are daily supplied with those dainty articles by their wholesale agents, Messrs. Isaac Crowson & Son, Cheese Manufacturers, who receive the same each morning at the New Provision Market, and immediately proceed to distribute the goods, by cart, to vendors and others in all parts of the metropolis. Care is therefore taken that a fresh supply should always be kept up.

Christmas is the great season for the Melton-Mowbray pies. Then these delicacies, although not made quite as prodigious in size as the famous pie which we read of in Peter Parley's "Christmas Tales," which was so unduly large as to necessitate its being carried in a waggon, nevertheless are from 20 lbs. to 25 lbs. in weight, and go to adorn many a gentleman's table. Nor are Messrs. Colin's renowned *spécialités* less indispensable during the annual "hunt" than at wedding breakfasts, where, almost invariably, they contribute to the adornment of the bridal-table. Like most genuine productions, the Melton Mowbray pies have their imitations. Certain manufacturers, not residents of Melton Mowbray, scruple not to mis-name their preparations, so as to deceive the public, while they offer the inducement of cheapness, at the same time that they proffer a spurious and inferior article. Those who want a thoroughly good and wholesome relish, should be careful in selecting the raised pies of Messrs. Colin & Co., which can be had at the reasonable retail rate of one shilling per pound.

In proof of the wholesomeness of these delicacies, I may add, that they are recommended by eminent members of the Medical profession.

CHAPTER IX.

TEA.

CERTAIN Chinese *literati* essay to give its origin. The period at which tea first became established amongst the "Celestials," is involved in mystery. Although the several accounts are purely legendary, they are none the less interesting on that score. One Mandarin asserts how a holy hermit, during his protracted watchings and prayers, had frequently fallen into slumber, and that in order to punish his body for such weakness of the flesh, in pious wrath he cut off his eyelids, and flung them on the ground, when directly a deity caused a tea shrub to spring out of them, the leaves of which exhibited the form of a human eyelid, fringed with lashes, which shrub possessed the rare virtue of preventing sleep. It is alleged, moreover, that when the austere ascetic had tasted and tested the miraculous plant, he instructed his countrymen in its use. Another writer, whose literary production dates as far back as the year 1693, ascribes the origin of tea-drinking to a dweller on Mount Sung-lo-Shan, an acclivity some three thousand feet high, situated in the province of Kiang-nan. The story goes that a Bonze of the Fo sect taught a Kiang-nan man, one Ko-Fy, the art of making tea, and hence it was called by the name of Sung-lo. In a short time the beverage gained high repute, while the Bonze grew rich, and abandoned the priestly calling. "The man is gone," notes the writer, "and only the name remains. Ye men of learning, and travellers who seek real Sung-lo tea, may now search in vain. That which is sold in the market is a mere counterfeit."

The tea-plant,* which is an evergreen, grows to the height of five or six feet. The leaves are about an inch and a half long, being narrow, indented, and tapering to a point, similar to those of the sweet briar. The colour is a dark green. The root is like that of the peach-tree, while the flowers resemble the wild rose. A number of irregular branches issue from the stem. The fruit is small, containing round blackish seeds, about the size of a bean. The shrub must have at least a three years' growth before it is fit for being plucked. This valuable plant is largely cultivated not only in China but also in India, Japan, and the Eastern Archipelago. There are two primary kinds of tea, namely the *Thea viridis*, or green shrub, and the *Thea Bohea*, or black plant. The former delights in elevated situations and a temperate climate. The latter requires the protection of valleys, the sloping sides of mountains, and the banks of rivers, with a more tropical sun. To the situations and the temperatures the delicate flavour of the green and the greater astringency of the black tea, are mainly due.

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* Thea sinensis, of the natural order of Columniferæ.

The green tea is produced from the same trees that yield the black, only that the young shoots are selected, which, in course of preparation, are rolled very closely. "Green tea," observes Dr. Edward Smith,* "has usually the more delicate flavour, and a given weight of it scarcely occupies half of the space occupied by black tea. Hence, if the quantity is measured and not weighed, an infusion of green tea will be twice or thrice as strong as an infusion of the same volume of black tea. To this should be attributed, at least in chief part, the greater effect which green tea exerts over the system." According to the analysis of Mulder † black tea possesses less tannin than green; but Sir Humphrey Davy and other eminent chemists are of a different opinion.

On the authority of Mr. Cochran,‡ when the bush has attained the height of four feet (after three years' careful attention and pruning) it is considered fit to be included in the first-leaf harvest. Directly the refreshing spring showers have passed off, and a gracious sunshine succeeds,—which, aided by drying winds, chase away each leaflet's tears,—the tea-harvesting season commences with vigour. Hundreds, and occasionally thousands, of little merry leaf-gatherers may be seen sallying forth at early morning to their pleasant labour, singing, laughing, prattling, and dancing as they go. Then when the mid-day gong sounds, work ceases for the nonce, when these pretty, black-eyed, dark-haired damsels squat in groups among the bushes, while they partake of their frugal meal of rice, moistened by copious draughts of hot weak tea. Immense care is necessary in order to protect the delicate young leaf from injury. Hence extraordinary precautions are taken in case any taint should be communicated. As a rule the girls employed undergo a species of training to prepare them for their work. Not only so, but while engaged in plucking the flowery Pekoe they wear gloves of perfumed leather. Every leaf has to be plucked separately. Still, so expert are the pluckers that an average gathering would amount to twelve pounds weight daily for each person. There are three seasons. The first commences at the end of February, or the beginning of March; the second about the end of March, or the first week of April; the third in the end of May, or in June. The earliest leaves constitute the most exquisite and expensive teas; while the second crop forms the largest proportion of the entire produce. Although the May and June crops necessarily contain a number of partially withered leaves which produce rather a bitter infusion, yet they yield less soluble material, when subjected to the action of boiling water, than the teas of the previous seasons.

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* Practical Dietary. † Pharmaceutisches Central-Blatt für, 1838.
‡ Jottings from the Far East.

Tea, chemically considered, contains four important constituents. These embrace theine, tannin, gluten, and a volatile oil. The theine possesses the greatest value in respect to its influence on the human economy. This constituent, besides containing a large proportion of nitrogen, has the quality of arresting the waste of tissues at the same time that it produces exhilarating effects; which properties cause tea to be so invaluable a beverage, especially to the aged, and those suffering from *ennui*, physical fatigue, or mental prostration:

> "The Muses' friend, tea, does our fancy aid
> Repress those vapours which the head invade."*

The exact proportion of theine in tea varies considerably according to the quality of the article, and is chiefly found in the young growths of the early spring crop.

Tea was first introduced into Europe in 1610 by the Dutch East India Company. It is alleged to have been imported to England from Holland by the Earls of Arlington and Ossory, who brought it into fashion among people of quality.† However, from an Act of Parliament passed in 1660,‡ it is clear that a duty of eightpence was laid on every gallon of the infusion sold in coffee-houses. Its price until 1707 was 60*s*. per pound; but on certain occasions it was sold for double, and even nearly treble, that sum. That tea was a rare luxury in the beginning of the eighteenth century is clear from the annexed announcement culled from the *Daily Courant* of March 21, 1709:—

> "For the benefit of retailers. Bohea tea at 16s. a pound (except the Bohea tea per ship *Loyal Bliss*), none equal to it. Bohea tea at 12*s*. per pound that exceeds most that is sold at 20*s*. per pound,

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* Waller. † The London Encyclopædia, vol. xxi., art. TEA.
‡ 12 Charles II., c. 13.

and a variety of green tea, with encouragement in proportion to the quantity. Sold by Robert Fry, Druggist, at the Bell in Gracechurch Street."

During Queen Anne's time chemists retailed tea and coffee, while Bohea was almost the only description of tea imported. Twenty shillings a pound many years after this was the price of tea bought for Pope's "Belinda."*

So precious is this exotic shrub considered, principally owing to the presence of theine, that in countries where a difficulty exists in obtaining it, resort is had to substitutes which assimilate more or less thereto. These chiefly consist of maté, guarana, coffee-leaves, the kola-nut, and what are denominated Siberian tea, (leaves of *Saxifraga crassifolia*), Appalachian tea, (leaves of *Prinosglabra*), Labrador tea, (leaves of *Ledum buxifolium*), Chilian tea, (leaves of *Eugenia ugni*), Trinidad Pimento tea, (leaves of *Eugenia pimento*), and the Faham tea of Mauritius. The leaves of the Partridge berry are likewise used in some parts of North America,† as well as the aromatic *Capitaô da matto* (*Lautana pseudothea*), and other equally poor substitutes.

The Eastern nations regard tea as possessing extraordinary virtues, while in China particularly it is extolled as the greatest of all medicines. The cause why gout and similar disorders are unknown amongst Orientals, is attributed to the chemical action of this beverage on the system. Dr. Lettsom,[*] in a work published over a century since, avers that the infusion of tea possesses two peculiarities ; the first, a sedative quality, and the next, considerable stringency, by which the relaxing power is corrected so that the solids become strengthened and braced. Indeed, this writer goes so far as to pronounce tea far preferable to any other known vegetable infusion, if not drank too hot or in too copious quantities, asserting that "if we take into consideration its known enlivening energy, our attachment to it will appear to be owing to its superiority in taste and effects to most other vegetables."

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* Rape of the Lock. † Chambers's Encyclopædia, vol. ix., art. TEA.

Dr. Edward Smith[†] speaks of "the cups that cheer but not inebriate" as being a potent agent, and as increasing the quantity of carbonic acid emitted by the lungs and the quantity of air inspired, while at the same time it gives greater depth and freedom to the respiration. "It is chiefly in its power," he remarks, "to increase the respiratory process that it acts so favourably, and in so doing the transformation of starchy and fatty food is promoted." Further on, the same authority observes: "The place which tea occupies in a dietary is scarcely that of a food, for it is never taken in the place of substantial food, but always with or after a meal consisting of solid food. When it is taken almost alone—as after excessive fatigue, or to keep the mind active, or to relieve a headache—it is in the nature of a medicine rather than of a food. It promotes the transformation of other food, and enables it to be eliminated from the body; and, therefore, when food has been taken in excess, or when it is not digested with sufficient rapidity, its action is very beneficial." Then he shows its vast advantages to the poor by remarking: "In the dietaries of the poor, where the meal must consist chiefly of bread—a substance not particularly savoury, nor digested with great rapidity,—the warm tea enables the recipient more readily to masticate and swallow the dry bread, or the bread with very little fat upon it, and so by its action to assist digestion.

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[*] Natural History of the Tea Tree, &c., with Observations on the Medical Qualities of Tea, &c. [†] Practical Dietary.

The eminent Dr. Parkes* avers that tea possesses a decidedly stimulative and restorative action on the nervous system, and at the same time that it obviates succeeding depression. This writer regards tea as a most useful article in cases of fever, when administered in the form of a cold, weak solution, and as being of great service to gouty subjects, and to those of a rheumatic tendency, (especially such as labour under lithic acid diathesis), when drunk without sugar and with little milk. Tea has been known to save life in cases of poisoning by tartar-emetic, the tannin being the active agent. Dr. Lewis's testimony† also goes to support the medicinal importance of tea. He mentions how it strengthens the stomach and intestines, is good against indigestion, nausea, and diarrhœa, refreshes the spirits in heaviness and sleepiness, and counteracts the operation of inebriating liquors.

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* On Hygiene. † Materia Medica.

Some men of mark in their day were notorious for their tea-drinking predilections. Dr. Johnson himself may fairly be set down as a *tea-gourmet.* Then, returning to more modern times, see how the genial Leigh Hunt forth bursts into rapture when describing the virtues of the beneficent plant, free from the cunning transformation practised upon it by unprincipled traders. Surely this gifted writer must have had a cup of Messrs. Horniman and Co.'s *spécialité* served to him when he could elaborate upon it thus: "It was not green tea; it was not black tea; neither too young, nor too old; not unpleasing with astringency on the one hand, nor with the insipid half-earthy taste of decayed vegetable matter on the other; it was tea in its most perfect state, full charged with aroma, which, when it was opened, diffused its fragrance through the whole apartment, putting all other perfumes to shame. . . . . . . Oh heavens! to sip that most exquisite cup of delight, was bliss almost too great for earth; a thousand years of rapture all concentrated into the space of a minute, as if the joy of all the world had been skimmed for my peculiar drinking, I should rather say imbibing, for to have swallowed that liquid like an ordinary beverage, without tasting every drop, would have been sacrilege."

Referring to tea Dr. Pereira,* an eminent authority, asserts that it "is admissible in a variety of maladies, in most of which it proves refreshing and agreeable. It is well adapted for febrile and inflammatory complaints, and is particularly valuable when we are desirous of checking sleep." Moreover, if the suggestion of Liebeg be correct, tea is not to be considered as a mere diluent, but as possessing nutritive powers of no ordinary kind. Mr. James F. W. Johnston* likewise bears testimony to the value of this tropical beverage. He remarks: "In the life of most persons a period arrives when the stomach no longer digests enough of the ordinary elements of food to make up for the natural daily waste of the bodily substance. The size and weight of the body, therefore, begin to diminish more or less perceptibly. At this period tea comes in as a medicine to arrest the waste, to keep the body from falling away so fast, and thus to enable the less energetic powers of digestion still to supply as much as is needed to repair the wear and tear of the solid tissues."

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* A Treatise on Food and Diet, &c.

Of course the chemical value of tea as a beverage depends upon the presence of volatile oil, theine, tannin, and gluten,—the four substances forming its most important ingredients,—and the proportions in which these exist. If tea be not genuine, or if it undergoes the artificial process of colouring, its character and efficacy become proportionately impaired. It is unfortunately too true that the market is glutted with tea which is either no tea at all, or else is excessively adulterated. On the testimony of the *Report of the House of Commons*, "millions of pounds of sloe, liquorice, and ash-tree leaves, are every year mixed with Chinese teas for England." It is well known that the leaves of the *Charrapal*, a Californian bush, are largely exported to China, when they return packed under the title of tea. A startling exposure was made a few years since, of the tea-rubbish styled "Finest New Season Kaisow," and "Fine Oanfa Congou" sold in bond at the rate of 1¼d. to 1¾d. per lb. Upon analysis the former was found to contain an enormous amount of mineral matter, chiefly iron filings; while the latter proved a mixture of re-dried tea-leaves, straw, fragments of matting, rice-husks, willow-leaves, and something resembling the excrement of silkworms. The "Maloo Mixture," likewise, once gained an unenviable notoriety, as did the "Extra Fine Moyune Gunpowder" put up for sale by auction in Mincing Lane, and in which Dr. Letheby discovered over 40 per cent. of iron filings and 19 per cent. of silica.

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* The Chemistry of Common Life.

Tea is adulterated in two ways. The foreign dealers first practice their arts upon it by having recourse to dried leaves, and by "facing"—a process which necessitates the use of Prussian blue, silica, gypsum, plumbago, lamp-black, ferruginous earth, and other abominations. Mr. Fortune,[*] in his interesting work, reveals the whole secret. Upon reading his graphic account of how tea is elaborated for the European market, one almost turns aghast! And with good reason, as there might be ample cause to suspect "death in the cup." Indeed, the people of

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[*] The Countries of China.

China are themselves disgusted at the tricks of traders, who carry on their fraudulent practices without concealment. A Chinese journal thus gives expression to the public sentiment: "The wonder is that such stuff (referring to re-dried and re-coloured leaves) should be suffered to be manufactured, much less to be shipped as a lawful export, for Chinese law expressly prohibits the re-manipulation of tea that has once been used, on the obvious and common sense principle that such a trade is necessarily, in its very essence, fraudulent. Yet, in the face of this well-known maxim, it is one of the thousand proofs which we have of the utter rottenness of the present Administration, that all round the Settlement, in every convenient open space, large quantities of what is termed, with ominous propriety, the 'mixture,' lie exposed to the sun at noon-day; in some cases within a hundred yards of the mixed court yamen. And not only so, but there are establishments, well known to the police, where the mixture is fired, leaded, packed, sold, and despatched for shipment; and experience has shown that it is useless to expect conviction, under Chinese law, from a Chinese magistrate." The same journal, referring to a peculiar kind of willow which grows abundantly in the country, the leaves of which are utilized by tea manufacturers, observes; "One needs not the expensive craft of the *cha-sze* to know how neatly a little skilful manipulation, and a little heat applied *secundum artem*, can transform those willow leaves into genuine and delicate tea leaves. Whether the mercantile result be intended to astonish the palates of old ladies in London or Glasgow, or to pass as genuine Souchong with skippers, who have little knowledge of tea, we know not: but the fact remains, that the trade thrives well and pays."

Nevertheless, there is still good and pure tea produced in China, and merchants in London who import it in an unadulterated condition, albeit a very large per-centage of the 175,000,000 lbs. annually consumed in Great Britain is spurious. One mercantile Firm in particular have gained a wide and well-deserved reputation for the purity and excellent character of their importations. I refer with pleasure to Messrs. Horniman & Co., London, who for nearly forty years have assiduously laboured to supply the public with both green and black tea, free from all mineral facing powder. As what passes through the Wormwood Street Warehouses to their agents all over the country is subjected to no deteriorating and deleterious manipulation in China, its perfect purity can implicitly be relied upon. The Chinese letter which accompanied the first shipment, by Messrs. Horniman, of tea into England is quite original and unique. The translation reads thus :

> "THE FLOURISHING FARM.—This is truly the very best tea, prepared with additional labour and free from colouring matter. The educated (or experienced) merchant, who is competent to consider it will please to take notice of its clear and genuine quality. We are honoured by your good orders, and shall proceed at once to the packing."

The testimony afforded by several eminent analytical authorities in favour of Messrs. Horniman's importations, are so satisfactory that nothing further can well be desired. The earliest of those documents is from Dr. Andrew Ure, F.R.S., Professor of Chemistry, who declares that upon chemical and microscopic examination of the samples taken from the Bonded Warehouses, he "found them (both black and green) to be perfectly free from all extraneous colouring matter, and in every respect genuine tea." Professor Ure further observes:—"The characteristic appearance of your green tea, namely, the dull olive hue, is unmistakeably different to the bright blue tint of the ordinary green teas of commerce, which is artificially imparted. This particular feature offers a perfect safeguard for the purity of the tea, in contrast with such sophisticated teas as I have sometimes been called upon to examine professionally for the Honourable Board of Excise, and which were coated with various powders that rendered them more or less unwholesome for use as an alimentary beverage."

Dr. Arthur Hill Hassall, Analyst of the County Sanitary Commission, and a well-known writer and authority on dietetics, after minutely describing the tests to which he subjected the tea submitted to him for analysis, winds up his report in the following words:—"These investigations enable me confidently to assume that the consumers of tea, now having fairly the choice of both the sophisticated and the pure, will not be slow in choosing between the wholesome natural kinds and those which are 'got up' for appearance, and in order to realize higher prices through their defects being hidden or glozed over with the powdered colours employed." The latest report is from the same authority, and bears a recent date. The opinion at first pronounced is herein but more strongly confirmed. The tea is characterized as being "perfectly pure, of superior quality, and free from facing." Moreover, the packages which the analyst purchased from some of Messrs. Horniman's agents, he affirms, after careful examination, "to correspond as regards purity and excellence of quality with those teas obtained from the Docks and from Messrs. Horniman's Wholesale Warehouses in London."

Nor do authors and publicists of weight refrain from offering willing testimony in favour of Messrs. Horniman's special importations. Dr. Scoffern* remarks how "its delicious flavour fully confirms its entire freedom from the usual powdered colour;" that he is "very partial to tea;" and that, in consequence of having long taken the pure beverage, his palate had become "the more critical." The only certain way to obtain truly cheap and choice tea is to purchase the leaf without the usual mineral "facing" powders; and that the public highly appreciate real economy is evident from the large and increasing trade carried on for the past forty years by Messrs. Horniman & Co., the original importers of the pure tea. Further, the agents of the Firm throughout the Kingdom, through Messrs. Horniman's direct operations, offer great advantages to the public, as they sell in the most distant neighbourhoods the same reliable article, at the same fixed price, as their most extensive City or West-end agents. In another article on Tea Consumption, appears the following: "Since the recent Parliamentary Report on Tea appeared, there has been a more general disinclination to use any that has been covered by the Chinese with mineral colour, for this report exposed the fact that it is done to hide the brownness of wintry growths, and enable them, when so disguised, to be sold mixed off with the best at high rates." From a lengthened experience I can bear testimony to the excellence and delicious character of the uncoloured article; while I am convinced that all who appreciate delicacy of flavour and fulness of taste, and prefer genuine tea to "counterfeit presentments," must arrive at the like conclusion.

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* Circle of the Sciences.

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CHAPTER X.

COFFEE.

IT cannot be gainsaid that coffee constitutes one of our most grateful beverages, and consequently stands high in the large and important catalogue of dietetics. But to obtain its finest qualities, and make the most of this choice gift of Nature and art, it is incumbent that select berries should be procured, that these should be roasted upon scientific principles, and afterwards ingeniously ground and properly prepared. The coffee plant, albeit indigenous to Arabia Felix and Ethiopia, is nevertheless widely cultivated in Asia and America. It is an evergreen shrub, nearly twenty feet high, bearing a two-seeded berry, oval in shape, succulent to the taste, and of a rich purple colour. A membraneous coat encloses the seeds. Sometimes the berry is imported without the covering being removed. In this condition the commodity is known in commercial parlance as "coffee in the husk." Generally speaking, however, coffee is imported in what is termed its "raw" state, that is, without the extraneous coating mentioned. The names by which the varieties of coffee are designated are derived from the places in which the same are cultivated; still, as regards their physical properties, they are mainly characterized by colour. Thus *par* *exemple*, Mocha coffee is of a dark yellow hue; East India, of a paler yellow; while the coffees of Ceylon, the West Indies, and the Brazils present rather a greenish tint.

The composition of "raw" coffee comprises no less than thirteen chemical constituents, embracing caffeic acid, tanno-caffeic acid, caffeine, wax, fixed oil, resin, gum, extractive, albumen, lignin, sulphur, lime, magnesia, water, and iron. It is well that the separate and aggregate elements contained in articles of human food should be known, inasmuch as an intelligent acquaintance with the chemical properties of any article of meat or drink goes far towards suggesting the rightful and most scientific mode of preparing the same for the table. Now, with respect to coffee, the sensible properties of the exhilarating berry undergo remarkable changes during the process of roasting, the agreeable aroma it contains being ascribed to the action of heat on the caffeic acid. Hence no slight skill is necessary to the due performance of this highly delicate operation. The ordinary mode of roasting coffee in this country is most defective, being but too generally performed upon no scientific principle, and by egregiously unskilled operators. But English folk, of all peoples on the face of the earth, are the most indifferent as to the intrinsic worth of the dietetic articles they get for their money. So complacent, patient, and long-suffering are they, that they take what is offered to them, accepting the vendor's guarantee with sublime credulity. Roasted coffee, when ground, is not invariably free from foreign substances, the principal of which is chicory, or the roasted root of the wild endive, a plant pretty extensively cultivated in Holland, Belgium, and Germany. Although when chicory is duly prepared, like mild coffee, and infused, it is far from being an unwholesome beverage; still, it not merely lacks the exquisite flavour which characterizes fine coffee, but literally deteriorates or even destroys the peculiar aroma which renders the latter so delicious to the palate and exhilarating to the animal spirits.

A few years since, Mr. W. P. Branson of Fenchurch Street, in a communication to the *Times*, remarked that the duty on coffee "had operated to discourage the application of inventive talent to improve it." Such might have been the case, to some extent, but assuredly not altogether. As every individual who does aught to augment the quality and character of any article of food in daily requisition should be regarded as a public benefactor, I have pleasure in mentioning that M. Picard, of Planters' Hall, 140, Strand, has, for the long period of ten years, been devoting his talents and energies to improvements in the preparation of coffee; and notably his labours have been crowned with singular success, and handsomely acknowledged by accredited public bodies in their official capacity. It is my object, among other things, to give what share of publicity I can to the inventions and practical operations of those who in any way have laboured to enhance the character and elevate the preparation of what we eat and drink. If, as the pithy and quaint aphorism has it, "Cleanliness is next to Godliness," assuredly to obtain the purest and best possible articles of general diet amounts to little short of a moral obligation, if it does not absolutely approximate to a religious duty.

The coffee which bears the name of M. Picard & Co. is produced by a *coupage* or blending of four or even five different descriptions of berries. These consist of Mocha, Java, Martinique, Plantation, &c. It is only when in combination that the special virtues of each become disseminated, and that an incomparable beverage can be procured. In France, and other Continental countries, coffee-roasting has been raised to an art. In England it is regarded merely as a kind of work appertaining to a porter. Across the English Channel, *torréficateurs*, or roasters, have to serve a number of years to acquire a knowledge of the ordinary routine of their business—a circumstance which forcibly illustrates the high importance attached to that by no means to be disregarded department of coffee preparation. Not only so, but they are compelled, after having served their seven years' apprenticeship, to take out a certificate of competency before they can possibly set up for themselves. On this side the water matters have not gone quite so far, as the authorities do not seriously busy themselves about the food of the people. On this theme a writer trenchantly observes—" Our licensing system in England is very extensive and elaborate, descending even to shoeblacks, and its requirements are often enforced—as we know to our intense annoyance—with considerable rigour; but coffee-roasters have not, as yet, that we are aware of, been brought within its scope." As the excellence of coffee, when decocted, materially depends upon how the berry has been roasted, it seems strange that in England so delicate an office should be entrusted to unskilled persons who possess little or no acquaintance with the nature of the article they tamper with, or the importance of their work.

The machinery used by M. Picard for coffee-roasting is most elaborate. In lieu of the ordinary "drum," or roasting-cylinder usually in vogue, he employs a spherically-shaped contrivance, and for the obvious reason that it ensures a more uniform roasting of the berries. As every variety of berry needs to be treated differently, it is of the utmost importance that the operator should know how to proceed scientifically or intelligently with his task. Should he, for instance, neglect to let off the vapours which the sharp process of torrefaction generates, then the coffee would be rendered damp, heavy, and sour; while, on the other hand, should the emission of vapour be prematurely interrupted, or even continued too long, the results would be that the coffee would contract a raw, disagreeable flavour, and the berries become charred and bitter after having been submitted to the grinding operation. The coffee-roasting machine employed by M. Picard is supplied with a slide or valve, the purpose of which is to facilitate the letting off of the steam at any moment. This excellent contrivance is so mounted and balanced as to admit of being lifted from the fire, replaced, and again enclosed in its hemispherical hood, and all within the limits of a few seconds. In addition, certain improvements have been made as respects the manner of cooling the berries, after the roasting process is completed. One great merit of the new method consists in the fact that it roasts the berries throughout, an effect which the old-fashioned cylinder is apparently incapable of producing. Take as evidence the circumstance that a few berries roasted on the improved principle will crumble in the palm of the hand under comparatively slight pressure, while those prepared after the latter mode will not admit of crushing in so facile a way, and even then not perfectly. And what is the cause? Simply because the one is thoroughly and the other but partially roasted. The fact is that even the torrefaction of coffee becomes a matter of monetary interest to the roasters, whose profit is more or less enhanced by the imperfect manner in which the process is completed. When duly and scientifically performed, a slow fire is used until the berries have lost about 20 per cent. of their weight. But so active is the competition in this particular trade, that, to obtain a larger pecuniary advantage, to the cost of the consumers, by cutting down the price of the commodity, the roasting process is expedited, so as to ensure less than the 20 per cent. waste. An admixture of animal fat is likewise used to render the berries glossy, and thus pleasing to the eye; while cold water is thrown over them immediately after the roasting process is completed, which causes them to become swollen, thereby increasing their weight. In such case a quick instead of a slow fire is used, because its tendency is to ensure the lowest possible amount of disintegration. Perfect roasting facilitates the development of two properties in the berry—the caffeine and the tannin—to the presence of which, when decocted, coffee owes its refreshing and agreeable qualities. M. Picard's apparatus has stood the severest tests, and has in no instance failed.

The roasting process being completed, peculiar care is bestowed upon the grinding. To the uninitiated or the unscientific this might appear a matter of trivial importance. But so far from such being the case, it is one demanding the utmost skill, and to which too much attention cannot be paid. Generally speaking the roasted berry is ground too finely. The object may be a flagrantly dishonest one—and those who cater for the human stomach are not invariably overweighted with scrupulosity—inasmuch as finely-ground coffee admirably serves to conceal from the eye of the purchaser and the consumer alike whatever adulterations—I beg pardon, "additions"—certain not over and above conscientious dealers may deem it expedient to employ in order to augment their profit, however materially militating against the genuineness and quality of the article in which they trade. As over-roasting renders the berry "sour"—to employ a trade phrase—so over-grinding is productive of much mischief. It not only dissipates the exquisite aroma peculiar to such highly delicate fruit, but renders it "flat, stale, and unprofitable," and in solution, tasteless, insipid, and unexhilarating. In France, the process of torrifying or roasting occupies the rank of a special industry, in which the State manifests an interest, for the sake of its subjects. In England it can scarcely be termed a regular calling, for the most unskilful essay to perform the work. Even in a matter so simple there remains ample room for reform.

I now proceed to notice M. Picard's ingenious *cafètiere* without which, however excellent the coffee, the very finest possible decoction cannot be procured. Although of four different forms, still the principle adopted is exactly the same in all. Some *cafètieres* are designed for immediate consumption in small quantities. Others are intended for hotels and large establishments of less importance. Others again for family use. The apparatus essentially consists of two vessels. The upper one, in which the infusion is prepared is movable; while the lower one, or the coffee pot proper, is that in which the liquid is received *minus* the dregs. The ground coffee being placed in the upper chamber, the water is admitted into the lower by a small tube which reaches to the bottom. Upon placing the lower vessel over a lighted lamp or fire, the water contained in it speedily boils, when the steam pressure on its upper surface forces it through the tube into the higher vase, where it mixes with the coffee; a slight stirring with a spoon facilitating the admixture. It can then be poured off at one's option, the arrangement admitting of the process being checked at any point, so that the strength of the beverage can be nicely adjusted according to the operator's desire. And here it will be opportune to observe that coffee made of the best berries, and after the most approved fashion, invariably becomes flat and undrinkable after it has been suffered to stand for any considerable time apart from the refuse or dregs. To obviate this difficulty in the *cafètieres* designed for hotels and restaurants, M. Picard employs a copper cylinder, properly tinned in the inside. This is fitted with a cover, and having a tap, placed in the side, not more than three inches from the bottom. Into this receptacle the coffee and the water are placed and heated. As the dregs fall to the base of the vessel below the level of the tap clear coffee is always drawn off, notwithstanding that the beverage rests in contact with the *residuum.* By this simple contrivance the prepared coffee will retain its flavour and refreshing properties as long as may be necessary; while it can be made of the proper temperature by placing the apparatus in a *bain-marie*, or holding the same over a lamp. M. Picard has kindly taken the trouble fully to explain the process to the writer, and produced for his delectation a cup of the fragrant beverage *in puris naturalibus*, which tasted more like a delicious *liqueur* than ordinary coffee.

I must concede that pure coffee is not particularly cheap. No doubt spurious compounds—French and English—can be obtained at as low a price as one shilling per pound, but such a " presentment " of the genuine article—such shocking stuff— is really little better than a clever admixture of chicory, horse-beans, and other substitutes possibly not half so innocuous.

Pure coffee, when properly made, possesses even medicinal effects; it operates upon the constitution in a variety of ways; goes far, when used in moderation, towards recouping exhausted nature; while its action on the human system, with few exceptions, is highly salutary, as all medical writers on the subject fully attest. M. Picard has, by his admirable process, manifestly done much for the public benefit, and hence he deserves, in common with all other active workers in the like sphere, the hearty thanks not alone of *gourmets*, but of those having an interest in the progress of sobriety, home comfort, the proper preparation of food, the invention of economising apparatus for such preparation, and all other things that conspire towards aiding national progress in every sense of the term.

M. Picard's latest and most important invention is a patented apparatus denominated the "Circulating Coffee and Tea Making Machine." Its simplicity, efficiency, and economical character are apparent. By its instrumentality one gallon of excellent tea can be made with a single ounce of the leaf, and a like quantity of good coffee with three ounces of that article. The operation lasts but from seven to fifteen minutes, according as the water is either hot or cold. The larger-sized machines are constructed to receive from three to five hundred pints; the smaller ones up to twenty pints. The former can be used on coal or wood; the latter on gas or spirit lamps. So automatic is the process that little or no skill is required in their regulation. Our public establishments, such as barracks, hospitals, schools, hotels, &c., will doubtless derive considerable advantage through the employment of M. Picard's valuable invention. The machine is already utilized in the French Army, a fact which speaks strongly in its favour.

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CHAPTER XI.

COCOA AND CHOCOLATE.

COCOA, more properly named cacao, is unquestionably one of our most valuable dietetic preparations. Linnæus estimated it so highly as to pronounce it "food fit for the gods," and for this reason denominated it *Theobroma.* The great botanist, indeed, seems to have been almost as partial to cocoa as was the Emperor Montezuma, who, on the authority of the historian Prescott, partook of no other beverage. At all events, it must be regarded as the special gift of a beneficent Providence to the inhabitants of tropical climates. Even the Spaniards, by whom it was discovered and introduced into Europe, did not at first appreciate its virtues, notwithstanding that they long kept its preparation a secret. But this singular repugnance did not endure for any considerable time, albeit it appears to have been deep-rooted, from the fact that Benzo, one of their earliest travellers, describes it as "a drink more fitted for a pig than a human being." Subsequently, a Spaniard's love of the beverage possessed almost the force and fervency of a passion.

The seeds or kernels from which cocoa is produced are contained in envelopes or pods. Each pod contains from twenty to thirty nuts, about the size of a large almond. The shell is of a dark colour, and is both thin and brittle. Throughout, the kernel possesses a conspicuously brown hue. As regards the nuts, they are characterized by a light and rather agreeable odour. Although unctuous and somewhat bitter, they are far from being ungrateful to the palate. The pulp which encloses the beans is of a rose colour; and, as its substance is sweet, like a water-melon, it is used for food. One remarkable characteristic of the tree consists in the fact that the leaves and flowers, together with the unripe and mature fruit, grow exuberantly at one and the same time. The fruit has to be gathered whenever it is ripe, nevertheless the months of June and December are the periods in which it becomes most plentiful. These are known as the harvest months of the cocoa plantations.

As soon as the precious fruit is disengaged from the tree, by means of long wooden forks, it is collected in heaps and then removed to sheds. Here the pods are opened and the seeds taken out. The next process is what is technically termed "curing." On the due performance of this much depends; not merely great delicacy, but much experience and no inconsiderable skill, being necessary in order to conduct the same successfully. If improperly or carelessly performed, the cocoa is likely to be much deteriorated, and its fine flavour destroyed. The "curing" is carried out in two ways. The simplest mode is to place the seeds in the sun until they are dried. The next is by "claying;" when nuts are placed in holes dug in the ground and covered over with clay so that they may undergo a slight fermentation. This operation causes them to lose a certain portion of moisture, which is supplied by the pulp that adheres to the seeds, thereby getting rid of a portion of their bitter and acrid qualities. Still, while fermentation is progressing, the nuts have to be stirred at intervals, in order to prevent its too rapid action. As soon as the aroma is well developed, the beans or nuts are turned out into shallow wooden vessels, or placed on mats until entirely free from moisture, when they are collected in bags and are ready for use and exportation. Such nuts as have been subjected to fermentation readily lose their shells, and open into divers lobes like split beans. The shells, which amount to nearly twelve per cent. of the entire weight, are detached by winnowing. These form an inferior quality of cocoa, and may be used for food by long boiling. The nutritive properties they possess are exceedingly slight, as they contain but little theobromine and fat, only a trivial proportion of mucilage, and no starch, while vegetable matter predominates. They have, notwithstanding, their degree of commercial value, and are largely used in Ireland. The irregular, angular-shaped pieces into which the seeds separate, upon pressure being applied, are termed "nibs." This is considered the purest form in which cocoa can possibly be obtained.

The chemical composition of cocoa comprises oil (cocoa butter), gluten, starch, water, albumen, and theobromine. The last-named is a white, crystalizable substance, equivalent to the theine in tea, but containing a larger proportion of nitrogen. The oil resembles tallow in whiteness and consistence, and is not only mild and agreeable in flavour, but not liable to turn rancid. Such constituents as starch, gum, gluten, &c., give to cocoa the variety of nutritive qualities contained in milk; and, like milk, it contains every ingredient essential to the growth and sustenance of the human body. Accordingly, its value as a dietetic may easily be conceived. A volatile aromatic oil and an astringent principle are present which affect both the flavour and the qualities of the preparation. The former develops in the roasting, producing a sensible aroma. Neither coffee nor tea possesses the nutritious, oily matter of cocoa, which is in the proportion of fifty-one per cent.

It appears that cocoa was not introduced into Europe until the year 1520, when Christopher Columbus brought samples of the nut; and then a century at least must have transpired before the inhabitants of this country became acquainted with so valuable a product. Nor has it even yet been used so extensively in England as on the Continent. For many years after the introduction of raw cocoa, its manufacture was most rudely conducted, no effort being made to separate the husk from the nib.

Now, assuredly, there is no lack of cocoa manufacturers; and the fierce competition carried on among them shows how profitable the trade in cocoa compounds must be. Some of these compounds are characterized by peculiar titles, such as "Rock," "Soluble," "Concentrated," and "Pure." In price they vary from 10d. to 1s. 4d. and 3s. 9d. The soluble cocoa powder, being usually a compound substance, should only consist of cocoa, arrowroot, or other farinaceous ingredients.

And now a word respecting Chocolate. This the ancient Aztecs used to prepare with singular skill. To such a consistency did they bring the froth that it resembled a solid rather than a fluid. The Spanish conquerors recorded their appreciation of its peculiar flavour and nutritious qualities, a single cup, according to Solis,* being considered sufficient to sustain a soldier on the longest day's march. Even its medicinal value soon became appreciated by the physicians of Europe. Hoffman, in treating of it in his monograph,† recommends its use in many cases, and mentions the instance of Cardinal Richelieu, who was completely cured of atrophy by employing the same dietetically. In acute diseases it is regarded as a mild, nourishing drink, and as a most advantageous diet for convalescents. It is true that it becomes repugnant to some delicate stomachs; but this circumstance may arise wholly or in part from the character of the article and the mode in which it is infused. The Indians, in trying their skill upon chocolate, made it in a very facile manner. The first process consisted in roasting the cocoa in earthen pots. Having cleared it of the husks and bruised it between flat stones, they formed the product into cakes with their hands. The usual mode of preparing chocolate is by grinding the nibs and reducing the same to a paste, when various articles are employed to flavour and scent the same. The Aztecs used to employ vanilla and different spices, and this flavour is generally used throughout Europe; the French makers resort to musk and other perfumes; the Spaniards to cloves and cinnamon. As the chocolate frequently sold is but the "base presentment" of the genuine commodity, is it a matter of surprise that it is not a favourite beverage with the people generally? As various preparations of most inferior quality, and at low prices, are offered to the undiscerning public, it is important that they should purchase no commodity which did not bear the impress of some well-known and responsible manufacturer.

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* Conquest of Mexico. † Potus Chocolati.

Of course there are cocoa and chocolate manufacturers whose high reputation is ample guarantee for the genuineness of their varied preparations. Among such none can refuse the honour of precedence to the firm of Messrs. J. S. Fry & Sons, Bristol and London. The origin of their house dates as far back as 1728. So earnest and persistent have been the efforts of its founders, and their honourable successors, to render their productions all that could reasonably be desired, that their business kept extending year after year until it has reached its present gratifying proportions. Even for over a century their chocolate has been used by the Royal Family, to whom Messrs. Fry

& Sons are at present the authorized "Purveyors by Appointment." Not only have the most eminent analyists given unequivocal testimony in favour of this Firm's manufactures, but Prize Medals—some Gold—were awarded for the same at the ten great Expositions of the Industry of all Nations, namely, London, New York, Paris, Dublin, Moscow, Vienna, and Philadelphia.

Messrs. J. S. Fry & Sons *spécialités*, albeit numerous, may be divided into four groups. These embrace chocolates and cocoas easily soluble; cocoas requiring boiling; cake chocolate; and chocolates especially prepared for eating. No necessary effort is omitted on the part of the proprietors to render those commodities acceptable to the public—embracing the highest social grades—by combining with perfect solubility, where such a quality exists, fulness and delicacy of flavour, and perfect purity of composition.

But there are distinct preparations which cannot properly be omitted. The most prominent of these comprise "Fry's Milk Cocoa Paste," a mixture of fine cocoa with pure condensed milk, specially adapted for use at sea; "Fry's Iceland Moss Cocoa," an excellent combination of immense value to persons suffering from weak digestive powers, and who necessarily require light concentrated nourishment; "Fry's Extract of Cocoa," a delicious beverage, exclusively prepared from choice cocoa nibs, deprived of superfluous fatty matter; "Fry's Homœopathic Cocoa," an article equally adapted to invalids and general consumers, recommended by eminent physicians on account of its solubility and nutritious qualities; and "Fry's Caracas Cocoa," an invaluable preparation, which cannot be excelled, if indeed, it can be equalled. It is pretty well known that the cocoa tree abounds in the torrid region of Caracas, situated on the north coast of South America, where the fertile soil seems particularly to favour its development, and not only so, but where "Cacao Walks" are so carefully sheltered by extended groves of shady plaintains that, according to Dampier,* whose description dates nearly three centuries back, "the grateful nuts are never blighted, as in other places." The Caracas cocoa is authoritatively pronounced to be the best which the American soil produces.†

Equally to be commended for its choice qualities and pleasant flavour is "Fry's Caracas Chocolate," a preparation of Caracas and other high-class cocoas, long adopted in the manufacture of the finest chocolates of Europe. As it might prove tedious to enumerate all the preparations of Messrs. Fry & Sons, I shall content myself by naming "Fry's Chocolate Creams," and "Bonbons," which really are delicious. These are sold in elegant fancy boxes, apparently worth the price charged for their contents, and, consequently, are adapted for acceptable presents and for the ornamentation of Christmas trees. I am induced to make this timely suggestion as the festive season is now fast approaching. It is not going too far to affirm that each *spécialité* issuing from Messrs. J. S. Fry & Sons establishments is characterized by extreme purity and excellence.

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* A New Voyage Round the World.

† Consul-General Middleton in the *Journal of Applied Sciences.*

For many years prior to 1831, the quantity of cocoa consumed in England had not reached 500,000 pounds per annum. It is now (in 1876) about 10,400,000 pounds per annum; and I feel confident that one circumstance which has tended to check this increase has been the continual desire for a cheap article, to gratify which, some manufacturers have inflicted upon the public an inferior quality, thus producing an unjust prejudice against all kinds of chocolate and cocoa. This description of competition the public cannot too strongly deprecate.

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CHAPTER XII.

WATER.

AT a time when grave fears are entertained of a water famine in various populous places of England, it will not be uninteresting to go back some centuries and show how ancient London obtained its water supply, and next exhibit the development of the system by which the vastly-increasing demands of an ever-augmenting population have been met. In a tract written during the reign of Henry II., by Fitz-Stephen, secretary to no less a personage than Thomas â Beckett, the writer refers to the north suburb of the metropolis, where were to be found "choice fountains of water, sweet, wholesome, and clear, streaming forth among the glistening pebble stones." In the time of the Conqueror, when the population was not a tithe of what it now is, the water supply of London was derived from a variety of sources. It was had from the river Thames on the south, from the river Wells on the west, and from the Walbrook stream, which flowed through the City, severing both rivers in its course. Then there were a number of wells, all of which yielded copious supplies of translucent water, such as St. Clement's-well, Holy-well, Clerke's-well, what was denominated by the nasty name of the Smithfield "horse-pool," the stream near St. Giles's Without, Cripplegate, and the Langbourne Water, apparently a large source of supply, which, breaking from its spring source in Fenchurch Street, ran down Lombard Street to the Thames. In addition to these there were a number of private wells that served the City with "fresh and sweet water," if we are to accredit the unscientific authorities of those days.

By-and-bye, however, so mightily did the citizens increase, that the water supply grew insufficient. To remedy an evil so formidable, King Henry III. induced one Gilbert Sanford to grant permission for leaden water-pipes to be laid down from "the remote district of Tyburn," where water abounded, so as to supply the great conduit in West Cheap, which was erected in 1285. This arrangement seems to have met the regular requirements of the population for nearly two hundred years. In 1438 came another season of scarcity. Then the municipal authorities were necessitated to draw further supplies of water from Highgate. But this source proved of slight service. The following year resort was had to what were called the Abbot of Westminster's spring at Paddington, and, such not sufficing, to Hackney and Islington. Just one hundred and thirty years after, all available resources becoming exhausted, it was found necessary to employ elaborate machinery for the first time, by means of which to raise water from the Thames to a conduit on Dowgate Hill. In the good old times, the City magnates, from the Lord Mayor himself down to the aldermen and wardens of the great Guilds, took no slight interest in the water supply of the capital. It was their wont on special occasions to inspect the "conduit heads," a ceremony which partook somewhat of the nature of a carnival. They would ride out on horseback, and, having hunted the hare, would sit down to dinner at the head of a particular conduit. After the elaborate repast was over they would proceed to hunt the fox, when they rode into London, and proceeded to the Mansion House, where further revelry was held, and kept up into the "small hours" of the morning.

At the close of the sixteenth century, the water supply becoming scarce, a Dutchman named Maurice succeeded in raising water, by means of a wheel, from the Thames, when the same was conveyed by small pipes to numerous houses. Not long afterwards it was found incumbent that something further should be done to meet the daily-increasing needs of the citizens. Accordingly the highly-creditable project was formed of bringing water from the Chadwell and Amwell springs of Hertfordshire—a distance of twenty-one miles. The attempt, apparently proving too much for the Corporation, was undertaken single-handed by an experienced miner, Sir Hugh Myddelton, a citizen and a goldsmith. Great, indeed, was the joy of the London denizens when on the 29th of September, 1613, the gigantic scheme was accomplished, and a "New River" flowed into the City. But, as the poets says,

> "In great attempts 'tis glorious e'en to fail,"

so with the high-spirited man who embarked his whole fortune in this scheme. He lost all he possessed, sold his shares, and ended his days in comparative poverty. Half the stock of the company was afterwards inherited by King James, from whom it descended to Charles, who sold it for £500 a year. The example once set, other trading companies followed in its wake. The Southwark, the Lambeth, the Chelsea, the East London and West Middlesex, the Thames and Grand Junction Companies sprang up, with others that became absorbed, not being enabled to hold their own against the more powerful monopolies which carried everything before them. And now, in this year of Grace, although the entire area supplied by the Metropolitan Water Companies exceeds that of the Registrar-General's London district, and the water supplied during each month amounts to over one hundred and eleven millions of gallons, nevertheless the supply is not by any means adequate to the wants of our dense population.

Not long since the *Times* directed public attention to the impurity and inadequacy of the metropolitan water supply, remarking "that the time seems to have come when even ratepayers will no longer be contented to leave things as they are. It has for some little time been recognized that we can no longer afford to be at the mercy of private companies in such a matter Such companies, once in possession of a monopoly, have us completely at their mercy. We cannot force them to adopt the measures which are essential for our health and comfort, and they disdain all private complaints. The supply of such necessities of life ought to be in the hands of a body who are directly responsible to us, and whom we can, if we please, control. Such a body exists in the Metropolitan Board of Works, and accordingly it has already been provided that this Board should have power to purchase the undertakings of the water companies. But even the Board of Works would find it beyond their power to render Thames and Lea water pure, and they have thus been compelled to inquire whether they could obtain a supply for the metropolis from any other source. Besides the impurity of the existing water supply, it is inadequate for one of the most essential purposes—a purpose of which the importance becomes more urgent and more obvious every day. We do not possess a sufficient supply of water, pure or impure, to afford the metropolis any sufficient protection against the danger of fire. We are thus exposed to the double danger of conflagration and contamination, and neither risk can be avoided as long as we depend upon our existing sources of supply."

As a water famine in a city containing nearly four millions of inhabitants would prove most disastrous, various plans have been proposed by which such a dire calamity would be successfully and permanently prevented. Most of these could not be carried out without an alarming expenditure and an amount of engineering work truly formidable. I daresay some such attempt will have to be made at no very distant period, as it is plain that the existing resources are not sufficient, while London is continually extending its boundaries and enhancing its population. On sanitary grounds it becomes imperative that every house should have an ample daily supply of pure, wholesome water, and at considerably less cost than it can at present be obtained. Under existing arrangements we cannot even hope for so important a *desideratum.* And what is the dread result? Why, that fever and sickness of divers kinds prevail in the poorer districts of our huge social hive, inducing frightful discomfort, suffering, and mortality among the people, more especially the young. And it must be borne in mind that there is a close connection between physical uncleanliness and moral polution. As an earnest writer remarks:—"In many parts of London, on account of the want of water, we have localities from which fever is never absent. These are the centres whence sickness is always emanating—the ever-burning matches by which the flames of disease are relighted. And the social and moral evils of fever, its pauperizing effects, and prodigious expense are not easily realized; for much as we are alarmed by cholera, the returns show that in any one year fever kills as many as cholera."

It is well known that the visitations of cholera in London and Epping during 1866-67, and typhus in Essex the subsequent year, were directly traceable to impure water supplies; the low forms of organic life which gain admission to water polluted by putrescent matter, in all probablity, forming the specific poisons of those epidemics. The city wells which once were a considerable source of water supply, had to be abandoned, owing to the polluted character of the fluid they yielded. This arose in a great measure, if not wholly, from the contaminated soil of the old city graveyards, which, to employ the language of Mr. Seymour Haden,* "had become so saturated and super-saturated with animal matter that it could no longer properly be called soil." And what applies to the city of London is more or less applicable to all other towns in the kingdom.

After all, the compulsory discontinuance of intramural interment has given rise to sources of danger greater still. General cemeteries have sprung up in the suburbs, which, from their "choked" condition, are not simply standing eye-sores, but hot-beds of pestilence. Such are veritable plague-spots in our midst, which one day will develop and scatter death and destruction around. If it be desirable that widespread calamity should be averted, then should the metropolitan cemeteries be closed, and precautions taken against the out-burst of contagion. Mr. Haden points out how there exists an immense National Mausoleum at Woking, capable of vaster expansion, and calculated to meet the mortality of the metropolis for an indefinite period; that the distance from this great centre of population is sufficient to afford security to the public; while the Earth-to-Earth system of sepulture adopted by the London Necropolis Company, by facilitating the absorption of human remains, prevents the undesirable results which otherwise would ensue.

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* Earth to Earth.

Perhaps nothing is more deceptive than water. The ranker and fouler it is the brighter and more inviting it appears, owing to the presence of carbonic acid and nitre. Nor can eye or palate discover even a dangerous amount of putrescent organic matter therein when the fluid is fresh and cool, which qualities indicate organic decay. Whatever efforts the leading Water Companies may put forth to insure as pure a supply as the resources at their command will allow, nevertheless it is impossible for the highest engineering efficiency to prevent water acquiring deleterious taint on its tortuous passage through mains and pipes. Moreover, the stagnation and accumulation of impurities in cisterns, besides exposure to the atmosphere and its poisonous gases, render the difficulty of procuring pure water almost insuperable. Recently considerable agitation was occasioned in Exeter, not simply owing to the intermittent character of the water supply, but also in consequence of the impurity of the liquid itself. The source available to the Water Company was the Exe, which receives the sewage of Tiverton and other towns. As the Town Council failed to make arrangements with the old Company, a spirited public meeting was held, when it was unanimously resolved that a new Company should be formed and that the water supply should be obtained from Dartmoor. In all probability Londoners will find it necessary at no distant period to discover a purer source than either the Thames, the New River, or the Lea, for the water they drink. Indeed it cannot be too strongly impressed upon the public mind that the slightest taint of organic decomposition in the drinking water of a ponderous population, like that of "Greater London," constitutes a danger of no ordinary magnitude.

To drink ordinary water without being properly filtered is to run a risk. But were not such the case, regard to cleanliness alone ought to necessitate recourse to filtration, owing to the mineral and vegetable deposits—to pass over the living infusoria,—which it contains. Albeit the eight London Water Companies, in obedience to the legislative measure passed in 1852, have taken much pains and incurred a heavy outlay in providing huge reservoirs for storage and filtering beds, with the view of purifying the water supplied by them, yet they have but partially succeeded. It is supposed that the filter-beds, though of great thickness, have gradually grown saturated with saline and other deposits, owing to which their purifying power has become seriously impaired.

Among the best, if not absolutely the best, filter for domestic and general purposes yet invented, is the Animal Charcoal Filter, patented several years since, and now the property of the Water Purifying Company, 157, Strand, of which the late Earl of Shrewsbury was the chairman, such office being at present filled by Dr. W. I. Little. The main object of this Company is to introduce a universal system of domestic filtration of water as it flows from the cistern. To further this desirable end they have cisterns constructed of various sizes, according to the quantity of pure water required, and capable of yielding from a half to twelve gallons per minute. One description of these filters is solely intended for drinking purposes, while the others are meant for all culinary and domestic uses. Not only is this filter an effective contrivance, but it possesses the merit of being constructed on scientific principles. Its great purifying property lies in the animal charcoal which it contains. This of all substances applicable to effective filtration is indubitably the best. While it renders innoxious deleterious organic and other matter contained in the water subjected to its transforming power, it resists the wear and tear which filters of a different character are constantly undergoing. Alluding to the wonderful hygienic virtues of charcoal, Mr. Seymour Haden observes that "it has the property of absorbing and retaining in the multiplicity of its cells a large quantity, a magazine, in fact, of oxygen. Nothing from within—no mephitic vapours, poisons, or *contagia* of any kind—can pass through those cells into the outer air without being encountered and, in chemical language, burnt up by the oxygen within them."

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CHAPTER XIII.

EFFERVESCING WATERS.

THE demand for effervescing waters must be considerably augmenting, judging from the great number of manufacturers engaged in this particular trade. Of course the purity, and consequent wholesomeness, of aërated drinks must chiefly depend upon the quality of the water employed in their preparation. Those manufacturers therefore who make a *spécialité* of using only the purest and best fluid that can be procured, are deserving not simply of praise—which costs nothing—but of public confidence and support.

Among the first to command notice, on account of the excellence of the effervescing drinks they supply, is the Pure Water Company, whose manufactory is situated in Queen's Road, Battersea Park. The various productions they supply, including soda, seltzer, potash, carbonated, Lithia, Vichy, tonic waters, &c., besides beverages, such as lemonade and ginger-beer, are all made from distilled water, guaranteed to be not simply pure in the ordinary acceptation of that term, but also absolutely free from those organisms which abound in ordinary water. These assertions are confirmed by two eminent analysts, Dr. H. M. Noad, Professor of Chemistry at St. George's Hospital and

Dr. Letheby, Professor of Chemistry in the Medical College of the London Hospital, and Medical Officer of Health for the City of London. The *desideratum* of perfect purity in the effervescing potations used by the public cannot be estimated too highly when regarded from a sanitary point of view, especially as the *British Medical Journal* would lead us to understand that purity is not invariably a concomitant of such preparations. According to this weighty authority "a great disadvantage of some of the soda waters in use is that they are made with impure water, and that, after the effervescence subsides, they have a perceptively flat and fetid colour. This is so common with many soda waters that it is considered by many an essential character of aërated waters."

The soda and potass waters manufactured by the Pure Water Company usually contain five grains of bi-carbonate of soda and the like quantity of bi-carbonate of potass respectively. But this degree of chemical strength can be augmented, should it be so desired, to ten or even fifteen grains. Indeed any *formulæ* submitted by a member of the Medical profession for the preparation of specific waters are carefully followed. The machinery employed in the manufacture of effervescing waters is, moreover, guarded against the danger of contamination from lead, all the pipes used being of tin, and soldered at the joints. The Pure Water Company's preparations are in high repute, are extensively recommended by the Faculty, and are patronized by the leading club-houses, hotels, and other public establishments.

The Naturally-Pure Mineral Waters prepared by Messrs. W. and J. Burrow, of Great Malvern, command attention owing to their high character. The base of this Firm's various preparations is the fine naturally-pure water which springs direct from the famous "Holy Well" in the immediate neighbourhood. Moreover the waters are invariably bottled at the celebrated spring itself, thus obviating the necessity for storage and the possible contamination that may consequently ensue. So extremely pure is the Malvern water that a tumbler of it contains less than half a grain of mineral constituents, while it is absolutely free from organic impurity. The actual solids contained in a gallon of this excellent water amounts but to 6½ grains, while this residue mainly embraces the carbonates of lime, magnesia, and soda, sulphates of lime and soda, common salt with distinct traces of iron and iodine. The last named mineral deposits are of much value, for it is to the presence of such that the main renown of the Malvern water is wholly due, particularly so far as its curative properties are concerned. In a paper read some time since before the Irish Royal Society, Mr. Norman Tate, referring to the analysis he had made of it, spoke highly in its favour, while the late Professor Muspratt, who had obtained almost identical results from the adjoining St. Anne's Well, referred to the personal advantages he had derived from its use as a therapeutic agent. As more or less inconvenience was occasioned by the metropolitan public in procuring the required supply of plain and aërated waters from

Malvern, Messrs. Burrow have established an agency at the Vichy Water Depôt, 27, Margaret Street, W., although six dozen bottles and upwards are still forwarded from their head-quarters to any part of the Kingdom. At a time when the luxury of pure water is the exception and not the rule, it is satisfactory to know that the translucent fluid which issues from the syenitic rocks of the Malvern Hills, and which is both healthful and invigorating, can readily be procured.

Among the London manufacturers of Effervescing Waters whose preparations stand high in public estimation, must be mentioned Mr. Samuel Sainsbury, of 176, Strand, who is equally well-known for his delicious pure Fruit Syrup beverages, which regale many a thirsty soul during the sultry summer season. The pure soda and pure potass waters manufactured by Mr. Sainsbury are guaranteed to be of excellent strength, each bottle containing fifteen grains of bi-carbonate of soda and potass respectively. The Lithia water, again, contains five grains of carbonate of Lithia. Owing to the superior description of corks used, the waters are preserved fresh and good for six or even twelve months together.

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CHAPTER XIV.

WINE.

LITTLE doubt exists but that a knowledge of wine and its properties is coeval with the history of the human race. Mention is made of the juice of the grape both in the Mosaic narratives and the prophetic records ; while the most renowned poets of ancient Greece and Rome have not thought it beneath them to extol its virtues and sing its praises in undying verse. India is generally regarded as the birth-place of the vine, from which region it gradually extended over Asia Minor, Greece, Italy, Northern Africa, and Spain, and ultimately to the islands of the Atlantic, the United States, Mexico, South America, and even Australia. If the ancients did not perfectly understand the delicate and complex process of wine-making, they were by no means indifferent to the beneficial effects which age produced upon "the drink of the gods," by ripening and heightening its quality, and rendering it more grateful to the palate and supporting to the system. Homer in the "Odyssey" refers to wine which had attained the age of eleven years. Athenæus extols that which was older still ; while Pliny mentions a peculiar vintage which was two centuries old, and which he describes as being "thick as honey and rough to the taste." According to Horace the fruit of the vine cannot be excelled, and is of itself priceless :—

> "Quo Chium pretio cadum
> Mercemur!"

The wines of the Greeks and Romans possessed the advantage of being perfectly free from foreign alcoholic admixtures, which in after times were considered indispensable to their preservation and even marketable character and value.

The chemical constituents of grape-juice, according to Mulder, one of the best authorities on the subject, embrace water, sugar, gelatine, gum, fatty matter, wax, albumen, gluten, tartaric acid,—sometimes free and at other times in combination with potash, soda, and lime,—alumina, oxides of manganese and iron, sulphates of potash and soda, phosphate of lime, magnesia, and occasionally malic silicic, and citric acid. In addition, the skin of the grape contains tannic acid in addition to colouring matter. Of course important changes occur during the fermentative process, when new combinations are evolved, the principal of which embrace alcohol, acetic acid, tartarates of potash, lime, and magnesia. Fauré considers that the best wines possess a ropy and elastic substance, constituting the "body" which is so highly estimated in certain wines, such as those of Medoc. In his "Chemistry of Wine," Mulder gives the general characteristics of the wines of Germany and France. To Port he gives the first place, inasmuch as it is richest in alcohol. Madeira holds second rank. Then follow Liqueur wines which are stronger than

Red wines. Jurançon, Lacryma Christi, Benicarlo, Sauterne, &c., all containing at least from 12 to 15 per cent. of alcohol. Red French wines possess a lesser quantity, say from 9 to 14 per cent., and Champagne and Rhine Wine from 10 to 11 and from 9 to 10 per cent. respectively.

In the South and West of England the vine was cultivated at an early period, a fact attested on the authority of the "Domesday Book." The like experiment was undertaken as late as the middle of the seventeenth century, in the counties of Kent, Surrey, and Gloucestershire. That such efforts did not prove successful is no matter of surprise, considering the inconstant and unfavourable character of our climate. Wine was produced, it is true, which Evelyn pertinently characterises as being "good for little." Although Champagne, Bordeaux, and Burgundy were drunk in this country in the reign of Henry VIII., Sherry and Port did not come into favour until the close of the seventeenth century. During this period as Sir Emerson Tennant[*] mentions, wine drinking assumed a strangely intermittent character; at one time exhibiting the largest amount of consumption, and consequent revenue; and, anon, suddenly declining in both, irrespective of diminished duty and great natural prosperity.

At a time when so much inferior wine is introduced for consumption, it is satisfactory to know that there exists the Pure Wine Association, 22, Henrietta Street, Covent Garden, which was established in the year 1869. This Association guarantee all description o wines, particularly the Sherries, supplied by them to be perfectly free from "plaster" and its deleterious effects, and moreover, to contain no other ingredients than those naturally present in the fermented and matured juice of the grape. The delicate process to which the various wines are subjected, absolutely remove all impurities, without adding any foreign element whatever; while it obviates the necessity for resorting to brandy in order to "fortify" them for general use. The wines supplied by this Association have been very favourably noticed in journals devoted to Social Science and Sanitation. Their remarkable purity and excellence, however, are placed beyond dispute by the reports of eminent analysts, such as Dr. Thudichum, Dr. Hassall, Dr. Bartlett, and Mr. John Postgate, F.R.C.S., of Birmingham. Many of the wines are exempt from adventitious alcohol, while the natural wines of the Alto Douro, the Douro Valley, and the *Vin Ordinaire*, under its legitimate cognomen of Consumo, are sold by the Pure Wine Association. These wines are pronounced to be fine, refreshing, and gently stimulating.

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[*] Wine, its Uses and Taxation.

CHAPTER XV.

CO-OPERATIVE SUPPLY ASSOCIATIONS.

THE Co-operative system, which indicates the march of social progress, has been developing greatly during the past ten or a dozen years. Indeed it is a special feature of the wonderful age in which we live. It was found to be a social necessity. The experiment once tried and proved to be successful almost beyond expectation, was attempted again and again, the result being in most cases, highly satisfactory.

Regarding such Associations in an economic aspect, the public benefit accruing therefrom is immense. But apart from the mere matter of pecuniary saving, they have conferred other boons upon purchasers—boons which cannot be too highly appreciated. Although it may not be a matter of grave moment for the affluent classes to pay exorbitant prices for the domestic commodities they require, yet a saving of twenty or even ten per cent. affects seriously enough the bulk of the middle classes, but more especially the industrial orders to whom every shilling saved in necessary weekly purchases is of consequence. Then, combined with pecuniary saving, members of Co-operative Associations have a privilege scarcely less satisfactory. As a rule they are certain to obtain the choicest goods that the various markets can supply and which are carefully selected by competent men, so that the best of everything finds its way to the Stores.

Not only has the demand for these special establishments increased, but they are constantly increasing notably in the metropolis. Shares in speculations of this kind are regarded as being particularly valuable. As a leading journal recently observed in an article on "Protection for Purchasers" (in which the advantages arising from Co-operation is discussed), "No sooner is the prospectus of a new establishment of the kind put forth than its shares are picked up like magic. It has been calculated that whereas five years ago only one middle class family out of every ten dealt at one of these Co-operative Stores, the proportion has now increased to seven out of ten. So much so is this the case that a number of financial magnates have lately determined to take the matter up and to spread the movement on a sound basis throughout London. . . . An increase of income and a diminution of expenses amongst the hard-working classes of London must be regarded as something little short of a national benefit."

Among the leading Supply Associations of this great city the Army and Navy Co-operative Society, Limited, 117, Victoria Street, Westminster, stands honourably conspicuous. The object of its establishment was to meet a want that was deeply felt by supplying goods for the large and varied classes connected with it at the lowest remunerative rates, and the business undertaken has succeeded mightily. An immense body of patrons have responded to the call of its founders, and still continue to crown their efforts. During the first year the total amount of sales reached £130,280. The second year this result was more than doubled. It further augmented to £433,452 the third year; to £664,434 the fourth; while the fifth year showed a return of nearly one million sterling. Still the business of the Society is increasing, and at a rapid rate, the sales made in the United Kingdom, India, and the Colonies, being estimated at the enormous sum of £100,000 a month. I can but express my conviction that, in the language of the *Bullionist*, "With a continuance of prudent management prosperity seems assured in the future, while the success which is thus in store has been well earned by dilligent and careful supervision." Indeed a corporation that can transact such immense business, and yet keep its working expenses within six per cent. on the sales effected, cannot fail to grow in prosperity.

Equally worthy of commendable notice is the Civil Service Supply Association, Limited, whose Stores are situated at 136, Queen Victoria Street, City, Chandos Street and Bedford Street, Strand, and Tavistock Street, Covent Garden. Sales over £100,000 per month. This Association was founded in 1866. One peculiar feature thereof consists in the fact that it is solely managed by Civil servants, who certainly show remarkable aptness for the complicated and arduous work. As a financial undertaking the Association has proved a signal success, the present cash receipts exceeding a million pounds per annum.

Another very important corporation is the London and Westminster Supply Association, Limited, whose imposing Stores are at 10, 11, and 12, New Bridge Street, E.C. This body commenced business in March, 1876; and such was their good fortune that from that period to the end of the year the receipts amounted to the large sum of £67,775. If the Association had ever experienced a period of doubt and difficulty, it is now, at all events, an established success, being, as the Chairman remarked at the first ordinary general meeting, "a Company that any shareholder or ticketholder could refer to with pride and satisfaction—a Company that had been enabled to meet every commercial engagement into which it had entered without having to ask for a single day's credit or a single favour from any merchant it had dealt with."

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